SUPPLEMENT.

The Mining Journal,

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FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2514.—VOL. LIII. LONDON, SATURDAY, OCTOBER 27, 1883. PRICE (WITH THE JOURNAL) SIXPENCE BY POST £1 4s. PER ANNUM.

FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC —Highest Award for Effectiveness in Boring, and Economy in the Consumption of Air

JUBILEE EXHIBITION, 1882.

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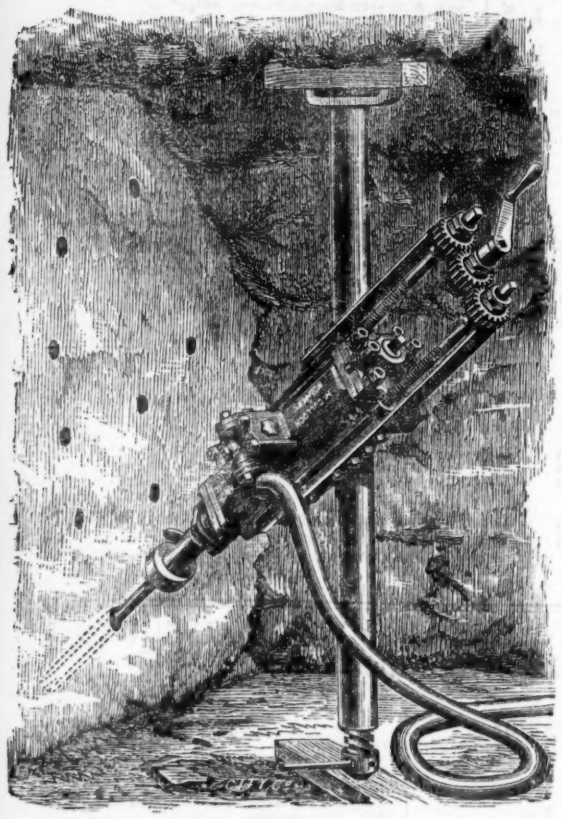

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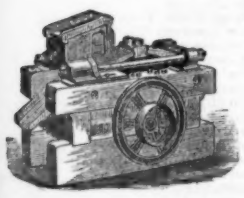

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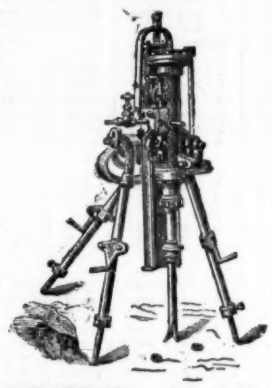

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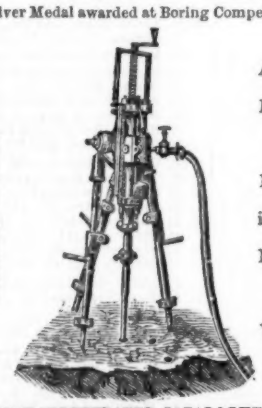

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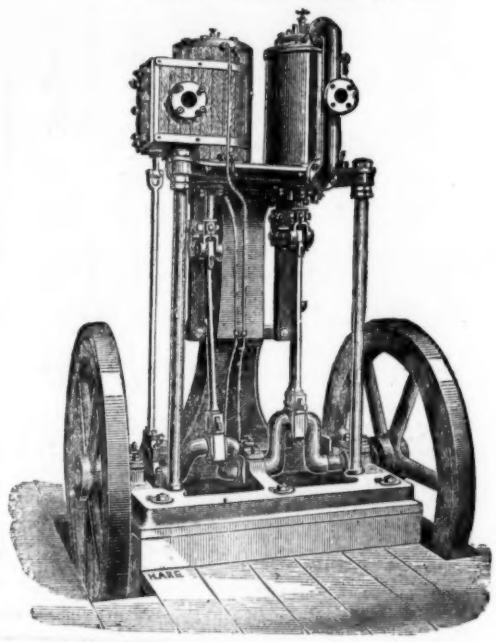

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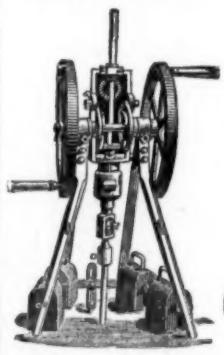

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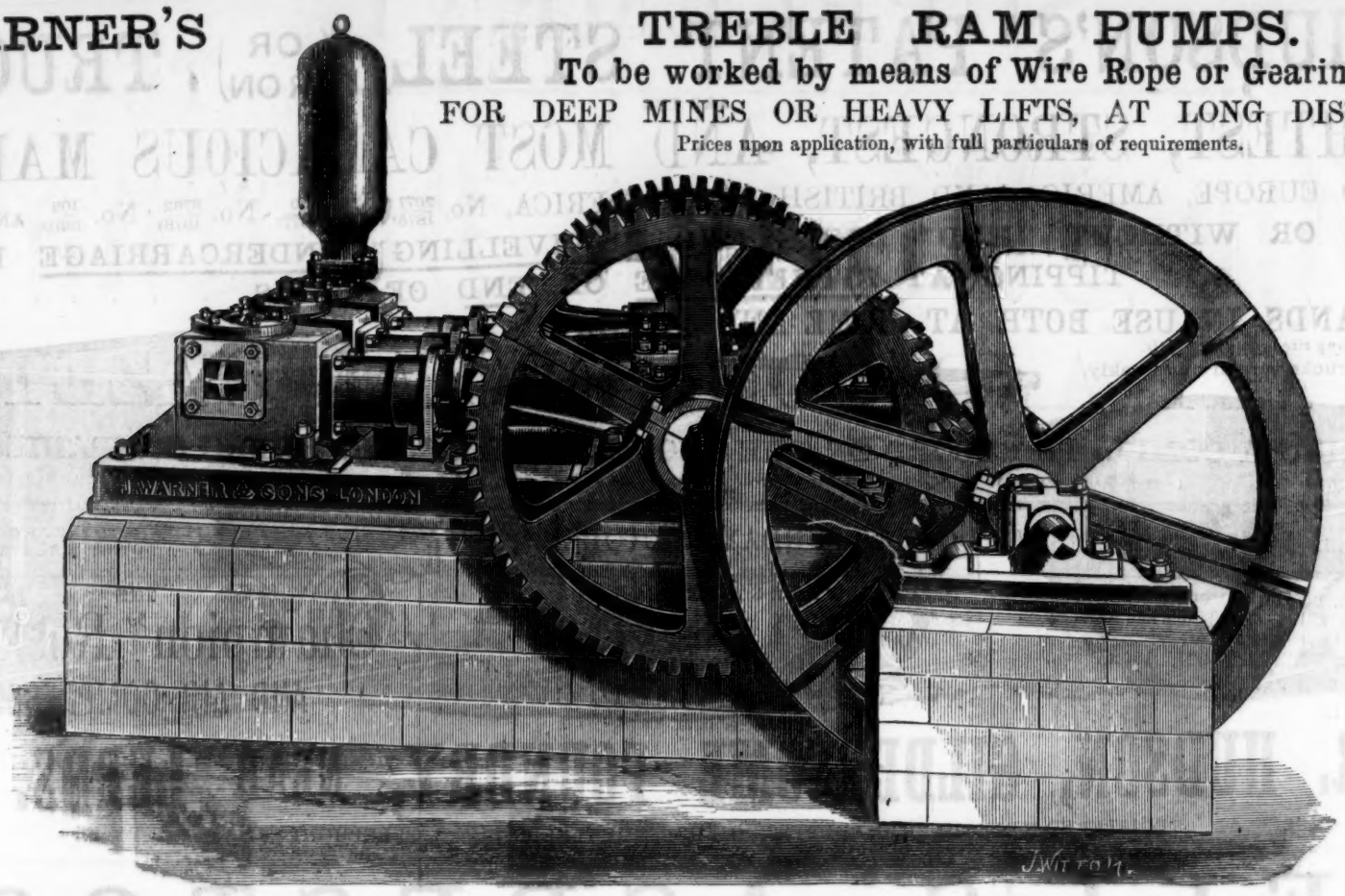

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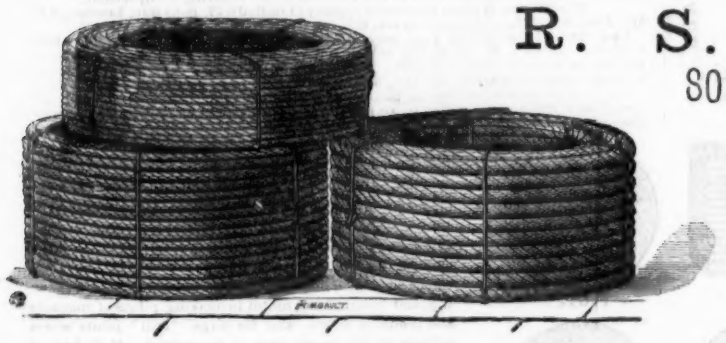

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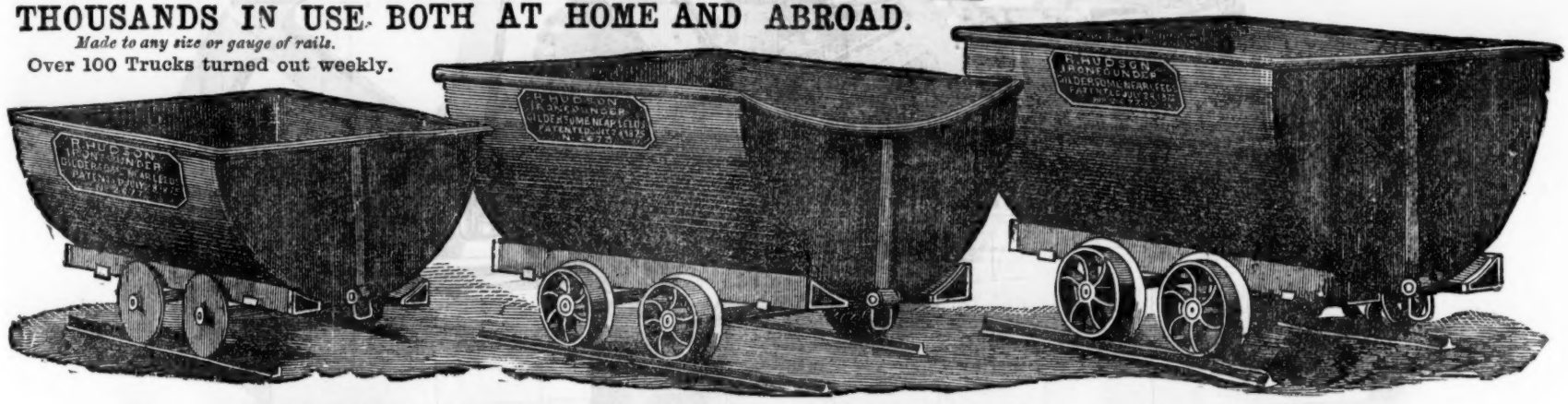

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It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in its selection and manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. So successfully has this been done, that with light screwing, it has been found in practice that little or no lubricant is required to ensure a minimum amount of friction, and to keep the rods from over-heating. An improved vacuum is always maintained by the use of this packing, which meets with unqualified approval wherever it is applied.

This packing is made in four forms to meet various requirements, viz., as Fig. 1, square; 2, round with solid rubber core; 3, with tubular rubber core; 4, without core, but with rubber inlaid.

As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

BELL'S PURE ASBESTOS PLAITED YARN PACKING. This is the best and most economical Piston Packing in the market for High and Low Pressure Stationary Engines. Of course there are many imitations of a Packing so universally approved of, but I am the Original and Sole Manufacturer of the genuine article.

Every 10 ft. length of this Packing bears a label with my Trade Mark, and users are recommended to see that this label is attached, to secure their obtaining the material they have ordered.

TRADE MARK.

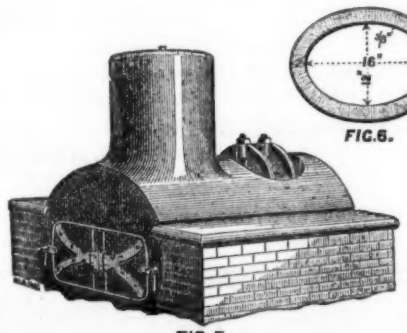

FIG.5.

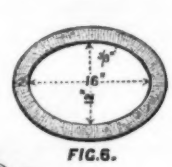

FIG.6.

FIG.1.

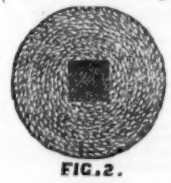

FIG.2.

FIG.4.

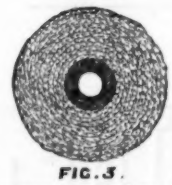

FIG.3.

BELL'S ASBESTOS YARN and SOAPSTONE PACKING for Locomotives, and all Stationary Engines running at a very high speed with intense friction.

The following Testimonial refers to this packing:—

Festiniog Railway, Locomotive Superintendent's Office, Portmadoc,
Mr. John Bell, 118, Southwark-street, S.E. January 13th, 1883.

Dear Sir,—I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting packing. The Asbestos Yarn we find is very useful, and answers admirably.

Yours truly, (Signed) W. WILLIAMS.

Every 10 ft. length of Bell's Asbestos Yarn and Soapstone Packing bears a special label with the Trade Mark, and engineers are earnestly requested to see that this label is attached, to prevent imposition by worthless imitations.

BELL'S ASBESTOS BOILER COVERING COMPOSITION (Fig. 5), for Coating the Pipes and Boilers of every kind of Marine and Stationary Engine. Non-combustible, and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is the most durable material of its class.

The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

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Dear Sir,—In answer to your request, I beg to inform you that I find the thermometer placed 3 ft. above the boilers now stands at 93°; before your covering was put on it used to stand at 126°. With regard to the saving of fuel, I am unable to speak very accurately, as the boilers were not working long enough before being covered to ascertain the amount of fuel that would be consumed in an ordinary run; but I feel quite justified in saying that we burn less by about 5 cwts. per night than we were doing, and I shall be glad at any time to show the boilers to anyone who may wish to see them, as I consider yours the best covering that I have up to the present seen.

Yours faithfully,
(Signed) J. H. CUNDALL, Works Manager.

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The engineer of a world-renowned firm writes:—"There is not, nor can there be, any doubt as to the excellence of your Asbestos and Indiarubber Woven Sheeting—as a jointing material it is unrivalled."

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It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these cheaper articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears my Trade Mark.

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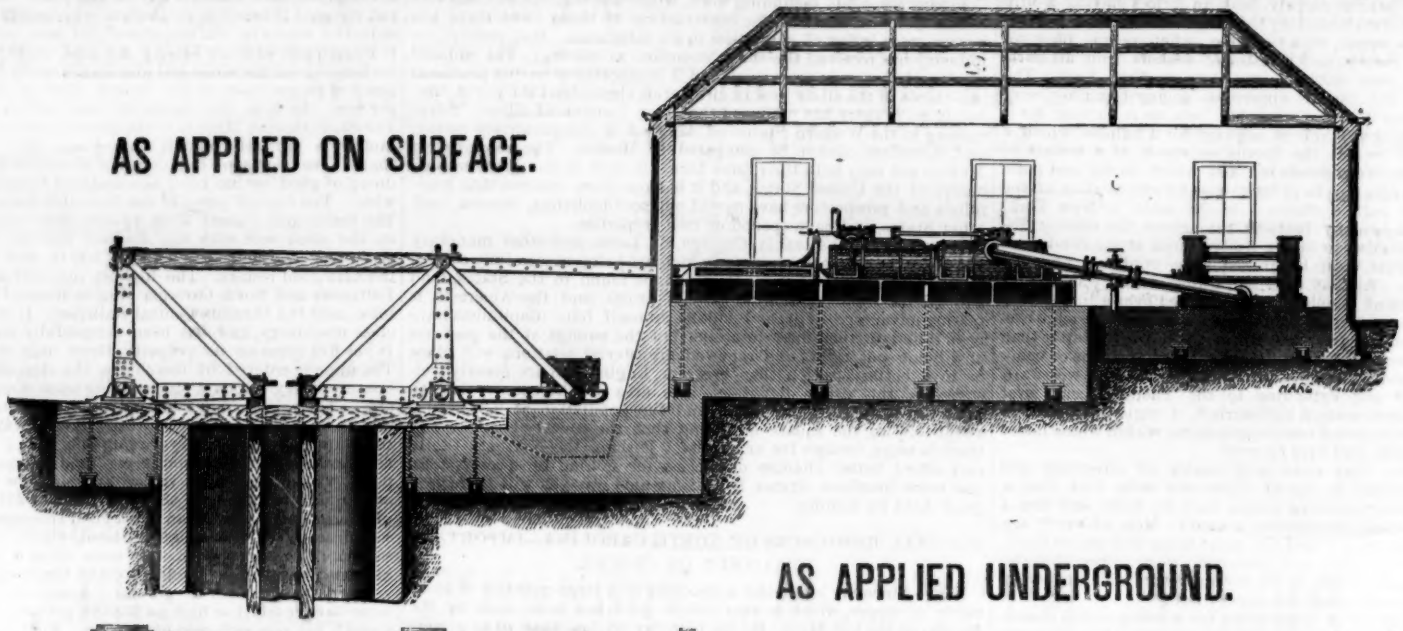

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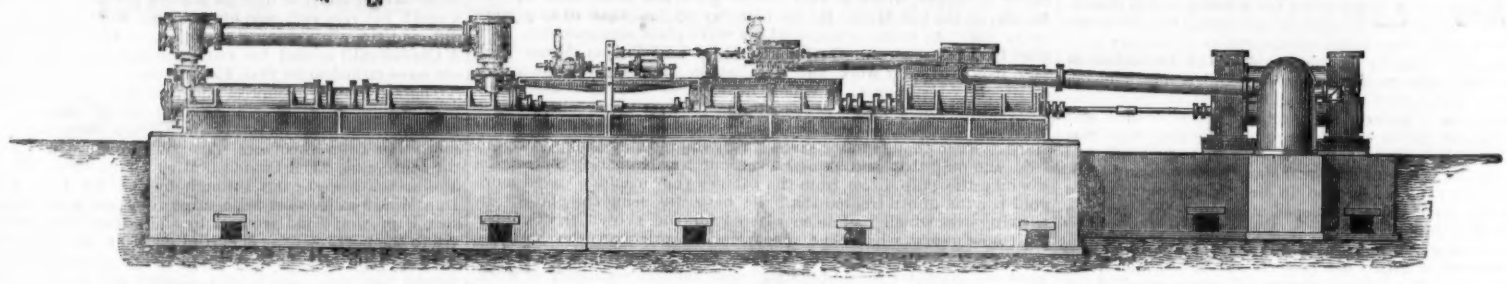

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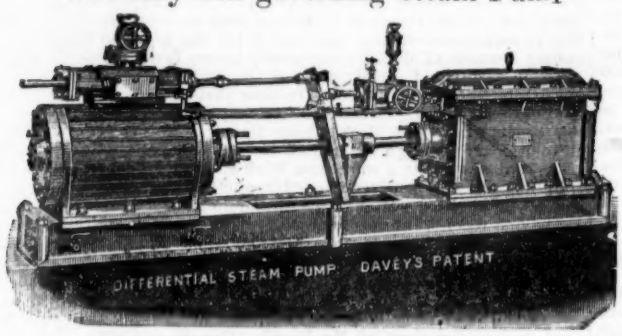

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Diameter of Steam Cylinder. Inches.	Diameter of Water Cylinder. Inches.	Length of stroke. Inches.	Gallons per Hour.	Height to which water can be raised with 40 lbs. steam pressure. Feet.	PRICE. £	Price with Condenser, in Suction Pipe. £	Price with Air Pump Condenser. £	Diameter of Suction and Delivery Pipes. Inches.	Diameter of Steam Pipe. Inches.	Diameter of Exhaust Pipe. Inches.
10	5	15	5,200	250	65	72	85	5 3/4	1 1/4	2 1/2
10	7	15	10,400	130	70	80	100	6	1 1/4	2 1/2
10	9	15	17,300	70	85	100	120	4 1/2	1 1/2	2 1/2
12	6	24	6,500	250	90	104	130	5 1/2	2	2 1/2
12	7	24	10,500	180	96	110	136	6	2	2 1/2
12	8	24	13,500	140	100	114	142	7	2	2 1/2
12	10	24	21,300	90	120	136	175	5 1/2	2	2 1/2
14	7	24	10,400	250	110	130	156	5 1/2	2 1/2	3
14	8	24	13,500	190	120	145	165	6	2 1/2	3
14	9	24	17,300	150	130	150	172	6 1/2	2 1/2	3
14	10	24	21,300	120	140	162	190	7 1/2	2 1/2	3
14	12	24	30,800	80	160	190	216	9	2 1/2	3
16	8	24	13,700	250	140	170	195	6	3	3 1/2
16	9	24	17,300	200	150	180	215	6 1/2	3	3 1/2
16	10	24	21,300	160	160	196	225	7 1/2	3	3 1/2
16	12	24	30,800	110	180	220	246	9	3	3 1/2
16	14	24	42,000	80	200	242	264	10 1/2	3	3 1/2

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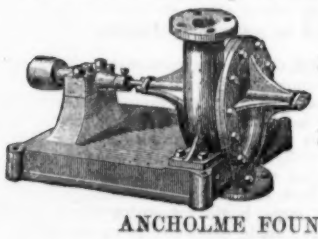

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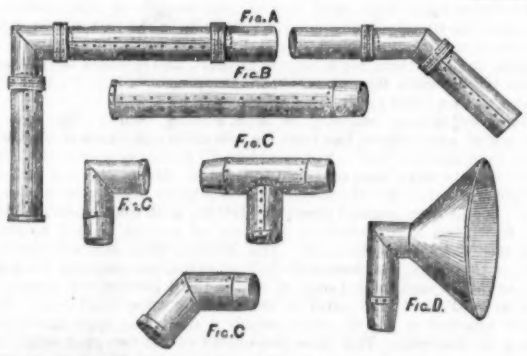

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Fig. A,—Shows the tubes adapted for any variation in direction.
Fig. B,—Straight length of tube.
Fig. C,—Different angle bends.
Fig. D,—Is a hopper to receive air at top of shaft.

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FIRST PRIZE, SYDNEY, 1880.

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Original Correspondence.

AMERICAN MINING NEWS.

SIR,—Inactivity has been the characteristic feature in mining stocks for some time past, public interest in the market has been absent, and the dealings, on the whole, have been chiefly amongst the brokers themselves, or street speculators, and the fluctuations in prices are rarely the result of individual operation. Still, money is cheap and abundant, a bountiful harvest is generally reported, and all the better class of stocks largely dealt in, prices having a firm upward tendency. Notwithstanding this, a general indisposition to deal in mining stocks exists, at a time, too, when people have returned from summer resorts, and investment seekers from all parts at this time of the year naturally gravitate to New York. The question why such is the case is uppermost amongst mining men, many of whom express it by a disconsolate look, as if sighing for a better state of things, and unable to account for a dulness which a little reflection would show is the inevitable result of a system of operation which cannot be commended, and which in the end must procure its own destruction. In order to give an explanation of the fact that mining is at such a discount in the main in New York, though pregnant with healthy features throughout the mining districts, it may be instructive to take a hasty glance at the conditions through which the Great West has passed since gold was first discovered in California. At that time the United States was a comparatively poor nation of people, thinly scattered over a little more than one-third of the vast region that now sends its representatives to the National Councils, having a Government but little better than a promising experiment, possessing limited and crude means of communication, with a vast and almost unknown region lying westward of the Missouri river and extending to the Pacific Ocean, over which bands of savages roamed undisturbed, a region supposed to consist of trackless deserts and barren mountains, within whose limits none but the most hardy had ever entered.

What wonder, then, that when wild stories of adventure and fabulous gold discoveries in far-off California were told, that a naturally restless and enterprising people took the fever, and that a wild rush for wealth and excitement ensued? Men of every age and calling joined the crowd, and the desire to go and see for themselves pervaded every mind, and excluded every other thought. Transportation companies took up the cry, and were aided by every power of pen and press to swell the eager throng.

But few thought of tools or implements for mining, or the chemical combinations of ores, or how to separate and save the gold when discovered; and not until they found themselves in a country producing barely enough to satisfy the meagre wants of its barbarous inhabitants, with but little money or clothing and a continent between them and the homes they had left, did they realise their situation, or that mining was a business requiring skill, perseverance, and systematic development, often taking years to complete; that machinery must be had, that roads and bridges were to be built, and that food must be imported or grown. Many sickened and died, others returned to their homes broken in health and purse, while others remained who have since developed an energy and resource such as has never been equalled.

A generation of time has not yet passed, and California from a wilderness has become a great and powerful State—the home of wealth and refinement. Her gold more than all others supplied the sinews of war which carried the nation successfully through the greatest civil conflict the world has ever witnessed. Her enterprise built the greatest of railroads, and the example of her people has converted other deserts into farms, and mountain fastnesses into mining camps and cities. The whistle of the locomotive echoes in a thousand canyons, bearing the wealth of her mines and vineyards to distant parts of the world. The history of California is but the exaggerated history of every mining camp, and those of Colorado and Nevada are no exception to the rule—first, a rumour, then a wild rush and eager search on peak and mountain. A town is built, hundreds upon hundreds of prospect holes are dug, a few pounds, or may be tons of ore are taken and carefully displayed in all public places, while crowds gather around saloons and gambling dens anxiously waiting for that sole hope of the professional prospector—a man from the East with money—to buy his claim. A few determined ones succeed by hook or by crook in getting their claims developed into profitable mines. Others sell out, while by far the greatest number—driven out by hunger—go off on some new rumour, where each one hopes that his time "to strike it rich" is yet to come.

It will be easily understood from such a state of things a species of gambling arose in all the large Eastern cities. Companies were started with no other object but projectors' benefit, and stocks to an incredible amount floated about representing so much worthless paper. Unscrupulous company-mongers rush off to the new fields, prepared to buy any number of claims, the value of which is not important to them, provided they can get time for payment, and obtain highly-coloured reports and flashy specimens of ores. With these in their possession, together with formal title papers, they hurry home, organise a company, with $10,000,000, $20,000,000, or $50,000,000 of paper capital, and with liberal advertising succeed in getting the stock, or at least a sufficient amount for their purpose, placed amongst the public; for a while all goes well, but the end is soon, and failure, the only result possible under the circumstances, quickly occurs. Those who bought the stock are ashamed to acknowledge the fact, and try to get rid of it at any price, and to forget their folly.

As a natural consequence of operations of this sort, together with the distrust produced by disreputable market jobbers, mining carries with it a sort of redolence not possessed by other commercial affairs, however much the latter may be subject to occasional depression; but it must not, however, be supposed that this slight sketch of the mining market represents mining proper, which it may be fairly stated is in as healthy a position as any other industry, and pursued with a vigour which must ensure success. In every mining section news of discoveries continue to flow in, and the amount of capital, privately or collectively, found to develope them is really astonishing.

It is from the development of such properties that Comstocks, Calumet and Hecla, the Homestead, Robert E. Lee, and a host of other well-known successes spring, the almost fabulous profits of which (the total dividends during the present year up to the end of September being $7,910,287, and for September, from 11 companies alone, $197,250) astonish the world. Dealings in the stocks of the companies which give these results are as regular and easy as in any of the most solid securities, and are not affected by the unhealthy condition of the ephemiral mining market referred to at the commencement of this article. It is deemed particularly opportune to draw attention to the above facts at this moment, when such a disposition exists amongst English capitalists to speculate in American mining stocks, and with investigation and care on their part to distinguish between the wheat and the tares they can invest with advantages rarely possessed in any part of the globe. ARGUS.

New York, Oct. 11.

MINING NOTES—MEXICO.

SIR,—Civil wars, bad roads, insecurity to life and property, and our political relations, have been in the past difficulties in the way of the advance of the British mining capitalist in Mexico. These in the main have passed away, and the way is clear for the exercise on the part of the capitalist of the fullest confidence in Mexico and her Government. A few years ago Mexico was as a sealed book, and the knowledge of it the most limited. But civilisation travels as quickly there as in any other land, and modern ideas, railways, telegraphs, and all social advantages and comforts are adopted as readily there as anywhere else. The fact is that the country is progressing by very rapid strides. The encouragement which has been shown to railway capitalists has done much, if, indeed, not all, in bringing about such great changes, for railways are great pioneers of progress. The policy which is being followed in the building of these lines might well be followed in some parts of Africa.

Success in railway enterprise is based on different lines in these new countries than that commonly adopted at home. Railway success in America is a matter of growth; but it is famed to be rapid, and, in the case of Mexican railways, results have exceeded expectations. The Mexican National line, which at present extends to Saltillo, about 60 miles beyond the beautiful city of Monterey, has, so far, been a great success, and every day brings an increment of passenger and general traffic. When this line is extended to the city of Mexico it is believed that the traffic will be very great, and, as the line traverses some 800 miles of the richest country and will have great feeders from the Atlantic and Pacific seaboards, the importance of the line will be second to none.

Already European goods are entering Mexico by this line. Transhipped at Southern ports of the States the goods pass free of United States duty in sealed cars into Mexico. The New International Company are again beginning work, while the Central Mexican line is nearly finished. With the construction of these lines there has been a great influx of capitalists in all directions. But, perhaps, no industry has received the same attention as mining. The mineral wealth of Mexico is proverbial, and it is reported as having produced two-thirds of the silver now in circulation throughout the world. Certainly no country has produced the same amount of silver. Silver mining in the Western States of America is comparatively young, and, therefore, cannot be compared to Mexico. The resources of Mexico not only hold their fame here, but also in the great mining camps of the United States, and it is from these centres that capitalists and prospectors have moved out to Chichuhua, Sonora, and other States, and have opened up rich properties.

New York, Pennsylvania, Chicago, St. Louis, and other monetary centres, have formed companies, which are being successfully carried on. Everything is cheaper than can be found in the States, land and labour stand at almost nominal prices, and the American is taking advantage of it, and making himself felt. Capitalists have been blind to their best interests, but the wrongs of the past are now being put right, and renewed ministerial relations will place us in a better position than ever, for Englishmen are greatly welcomed in this rising Republic. The area of the country is estimated at 743,948 square miles, and the population at 9,343,470—about 12½ to the square mile. So that the country is great, and there is scope enough for enterprise. Perhaps the Northern States may afford better chances of success for mining prospectors than the more Southern States, but turn which way you will there is a good field for mining. GABBOTT AND CO.

MINERAL RESOURCES OF NORTH CAROLINA—IMPORTANT DISCOVERY OF COPPER.

SIR,—Since my last letter a discovery of a large quantity of black oxide of copper, which is very rich in gold, has been made by Mr. Muffly, at the Cid Mine: in the first day no less than 10 tons were taken out. As to the working of my wave plate amalgamator, I am glad to say that at the Conrad Hill Gold and Copper Mines near here it is in regular work, and Mr. Clayton has just given me a very satisfactory testimonial, in which he says:—"We have used your wave plate amalgamator at these mines for over two weeks, and the results of our various trials have been very favourable to your machine. Your amalgamator saved a very appreciable amount of gold from the pulp that had passed over our amalgamating plates. In working the pulp direct from the battery your machine saved more gold per ton of ore treated than the batteries using the plates. In working ores which had been roasted for the extraction of copper your amalgamator has done much better work than the batteries with plates or the pans. From our present experience I consider your amalgamator for simplicity of construction, regularity of work, and results obtained as the most efficient and economical amalgamator of which I have any knowledge." If anything more were needed to show this appreciation of it it is supplied in the fact that he has already taken up three sets of plates out of four, and that he is going to put my amalgamator in their place, as so much more efficient and so much more easily managed and cleaned out. At present it is working along side of a set of plates for a longer test, but the said set of plates will be removed as soon as the amalgamators can be supplied.

There is, I assure you, ample room for profitable enterprise here if British capitalists choose to avail themselves of it, and to give them some idea of the immense wealth which exists, I subjoin a few extracts from Mr. P. M. Hale's volume, just issued, and which will no doubt be forwarded to you by the publishers in due course on the Coal and Iron Counties of North Carolina. Within a radius of 30 miles of Charlotte there are 10 cotton factories, half of which have over 4000 spindles each, and the M'Aden Mills, which are illuminated by electricity, have 8500 spindles, and a capacity for 50,000, which will be got to work as required. This is some evidence of the sound general trade of the district, but the readers of the Journal are of course chiefly interested in mines and machinery. Charlotte, as the Journal-Observer truly says, can show better opportunities for various manufacturing enterprises than any other city in the South. It has a start, and cannot retrograde. All in all persons locating in and about here will find a greater blending of all the requisites which produce business ease and home luxury at less cost and with lighter effort than can be found elsewhere.

There are nine gold mines in this county, which are now being operated. Its mining developments are mainly auriferous, but with the gold which has been found there has nearly always been a small per cent. of silver. Most of the mines yield at times some copper ore, and a few mines show a tendency to ore of that character nearly exclusively. Lead in the form of galena, or sulphuret of lead, has been found in the Moore and Smart Mines, on the borders of Union county. Numerous surface indications of iron are found in the western portion of the county, notably in Steel Creek township. The scarcity of iron in the South during the late war between the States, and the necessity for a good supply of that important sinew of war, stimulated an active search for the iron deposits which were thought to be indicated by the surface specimens found in several parts of the county, but the search was not rewarded with such success as to lead to the developing any iron mines of importance, and there is now little hope that any mineral wealth of that character will ever be found in the county. Just over the line, however, in Lincoln and Catawba counties, iron mines of great value have been worked, some of them for a century at least, and recently the owners of the High Shoals Mines have been shipping the iron ore to Pittsburg, Pa., at a good profit.

The gold mining industry of Mecklenburg county, like that of this metal everywhere, has been an eventful one—now in vigorous work, then almost dead. Not less than 55 localities within the area of the county have been explored for gold. At present the following are worked:—The Hopewell Mine is 9 miles north-west of Charlotte; it has been worked down for 100 ft., with good results. The ore, which has a considerable per cent. of copper, is said to assay only moderately well for gold. The M'Ginn Mine is 5 miles north-west of Charlotte, has three well-defined veins, two carrying the gold ores usually found in this section, and a third having rich copper as well as gold ore. The latter is the only ore prospected now. The depth reached is 165 ft., from which a drift has been lately run nearly to the vein. The more prominent of the two gold veins has been penetrated to a depth of 150 ft., and worked with some success as deep as the machinery could control the inflowing water. Different assays of the ores have been made, which range in value from $4·37 to $137·93 per ton. The gold vein above alluded to runs on the south into the adjacent Capp's mining property, where it is joined by another prominent vein. The system has been worked to a depth of 200 ft., but work at present is not carried on lower than 150 ft. At last reports several hundreds of tons of good ore were on the dump, and the work of development is to be continued. It has been worked for many years by different owners, and how much gold it has produced is a matter of conjecture, though it is credited in the neighbourhood with over $2,000,000. Different assays made at long intervals have been per ton as follows:—$7·10, $56·35, $96·37, $133, and 133·76. The Arlington Guarantee Mine, 5 miles west of Charlotte, has been worked to a depth of about 100 feet, and a large amount of brown ore is at command. The milling machinery at present in use is a modified form of the Old Carolina gold mill, and the prospective outlook is favourable. The Clark Mine, 2½ miles west of Charlotte, has been worked to a depth of 70 feet only, and nearly always with good results. Its ores have assayed from $8·34 to $161·44 per ton.

The Rudisill Mine, located 1 mile south-west of Charlotte, has been worked down to a depth of 300 ft., and its product is thought to have been very remunerative to its owners. No one now knows when it was first worked or how much gold it has produced, though it is popularly credited with $2,000,000, and it has proven so far the most valuable gold mine in the county, possibly because it has been more largely developed. Being almost in the suburbs of Charlotte it has always had a larger share of attention, and a larger capital has been employed in its development than any other mine in the county. The title to it has repeatedly been in litigation, but is now finally settled and the title perfect, and this fact has prevented the development which should have taken place. The ores are very rich, but the gold is found in sulphurets, which until the establishment of reduction works in the neighbourhood have proven very refractory. It is equipped with a 10-stamp mill and other necessary machinery for keeping out the water and also for elevating the ores. The highest assay of its ore made at the branch Mint in Charlotte was $130·22 per ton. It is in full operation now, and is paying handsomely. The St. Catharine Mine is in the near vicinity of the Rudisill, on the same vein probably, and is only ¼ mile west of Charlotte. Two shafts have been sunk to a depth of about 100 ft., and a considerable dump of good ore has been accumulated from a vein from 3 to 4 ft. wide. The highest assay of ore from this mine was $147·50 per ton. The Smith and Palmer Mine, 1½ mile west of Charlotte, is probably on the same vein with the Rudisill and St. Catharine Mines. A shaft has been sunk to a depth of 100 ft., and developments so far indicate good results. The highest reported assay is $149·59. The Baltimore and North Carolina Mine is situated 9 miles east of Charlotte, near the Carolina Central Railroad. It is equipped with first-class machinery, and has been successfully worked for some years. It has five veins on its property, three only of which are worked. The mine is entered by five shafts, the deepest being 120 ft. The ores are heavy sulphurets, containing some copper with some brown ores. The vein is from 1 to 4 ft. wide, the total length of which is said to be some 4 miles. The ores have always assayed well, and the plant is thought to be very valuable. The Ferris Mine lies 6 miles north-east of Charlotte, and is regarded as a prominent mining property, with at least three veins. It is not now operated. Assays of ores from this mine have shown a value of $512·94 per ton, though, of course, this was from an extra good specimen of ore. The Simpson Mine, in the same neighbourhood, yields quartz ores with little sulphurets. Assays from this mine show it to be valuable. The Stephen Wilson Mine, 9 miles west of Charlotte, has 10 well-defined veins on its 310 acres of ground. Assays of ores taken from this mine have reached as high as $355·96 per ton. The Black Mine has a small but very rich vein of the finest kind of brown ore, which at different times has assayed as follows:—$50·16, $56·86, $62, $488·12. A Chilian mill is used for reduction purposes, and large lots of the ore have milled more than $50 per ton.

These 13 mines comprise the principal mines in the county, but besides these gold, silver, and copper, and sometimes all three have been found at other points. The Carson, Sam Taylor, and Icynour south-west from Charlotte. The Wilson and M'Donald 1½ mile to the south-east. The Davidson Mine 1 mile west. The Trotter Mine 3 miles south-west; cut through by the Air Line Railroad. The Dun Mine 9 miles west, with three veins, one with copper. The Frasier, Hipp, and Todd are near by. The Henderson and the Chapman are to the north-west. The Hunter Mine, at Huntersville, 16 miles north of Charlotte, has been explored to a depth of 23 ft., with promising exposure. The Crosby, Rogers, and Pioneer Mills Mines are 12 to 17 miles north-east of Charlotte; they all carry copper pyrites in considerable quantity. The Newell and Pharr Mines are near by. The Johnston, Stinson, Maxwell, and Rea Mines are 7 to 9 miles east of Charlotte. The Tredinnick Mine is 7 miles east. The Alexander is 5½ miles east. The Caldwell is 6 miles north-east. The Harris Mine is 10 miles nearly east of Charlotte. The stretch of mining property upon which the mine is situated is thought to have some rich gravel. Surface Hill, one of these localities, is famous for its rich nuggets, and occasional pockets of ore are found of extreme richness. The farm of the Elliott Brothers, 5 miles south of Charlotte, is thought to contain several veins of gold ore, and the Nolan, Jordan, Means, Bennett, Cathey, G. C. Gathey, Sloan, Gibson, and the M'Corkle Mines are all within easy reach of Charlotte. It may be safely asserted that the outlook for the development of the mining interests of Mecklenburg county is very favourable.

The discovery and development of the gold mines of this county has exhibited the same phases as in other parts of the country where gold has been found. It is a tradition that the Oliver Mine, in Gaston county, near the Mecklenburg line, was worked prior to the Revolutionary War by a German miner, and a similar tradition attributes similar work to a mine near Rock Hill, S.C. A more reliable tradition indicates considerable underground work in the Aborigines Tunnel, at the Brown Mine, in South Carolina.

The first recorded discovery of gold in this section of the South was at the Reed Mine, in Cabarrus county, at that time a part of Mecklenburg county. Conrad Reed, son of the owner, in 1799 found a piece of native gold "as large as a smoothing iron," which is correct as the traditional "piece of chalk." Its value was not even guessed, and it is asserted that for several years it was used to hold the door of Mr. Reed's cabin in position. Its remarkable weight together with continued abrasions of its surface finally led to an enquiry as to its value, and finally Mr. Reed took it to Fayetteville, where a jeweller paid him $3·50 for it, which was perhaps not more than 1-50th of its real value. The same locality was for many years prolific of large masses, the largest indeed known until the gold discoveries of California and Australia. Col. John H. Wheeler, in his Sketches of North Carolina, gives a list of 14 nuggets found mainly in this section, which aggregated weighed 115 lbs. avoirdupois. The active work at the Reed Mine must have been considerably later than the beginning of the present century, and the substantial rewards received for this regular work led to a very general hunt for the precious metal along the entire Appalachian slope as early as 1820, and in numerous localities a general harvest was reaped.

At first only placers were worked, but the exhaustion of these led the miners to hunt up the veins which were the source of the supply, and it is certain that many of the mines mentioned in this catalogue were opened as early as 1825. At the outset the veins proved no less remunerative than the placer mining had done, for the ore was easily and cheaply mined, and the ores were quickly "reduced." The point was reached then, however, when the easily treated ores became refractory from the presence of unaltered sulphurets, and the occurrence of large bodies of water below the permanent water line (40 to 60 ft.) made expensive pumping apparatus a necessity, so increasing the cost of mining that work in the mines were seriously retarded, and many of the mines were abandoned. As a rule, the ores now mined in this section are the refractory sulphurets, which need a smelting or chemical treatment. The product of gold in this part of North Carolina had become so general by the year 1830 that grave inconvenience was experienced in its conversion into coin. The merchants charged a large commission for handling it, and four months were generally necessary for returns from the Philadelphia Mint. At length, in 1830, a commission was appointed by the State Legislature to investigate and report upon the subject, and this report and subsequent agitation led to the establishment of the Branch Mint at Charlotte by the Act of the Federal Congress of March 3, 1835. The mint was opened for business Dec, 4, 1837, but was burned down in July, 1844. It was re-erected in 1845-47, and did business regularly until the beginning of the Civil War. It was revived in 1867, but only as an assay office.

The entire amount of gold bullion deposited in the Charlotte Mint from its opening to June 30, 1882, was $5,473,765·46. The entire amount of gold bullion deposited at all offices of the United States up to June 30, 1882, from North Carolina was $10,786,316·09. In addition to this large amount it may be safely said that the amount actually produced was at least twice this amount, since it is well known that for 40 years the beauty of our native gold led to the consumption of largequantities for jewellery, which never passed through the Government offices. The ores of the county, as has already been stated, are mostly refractory sulphurets. To treat these three reduction works have recently been erected in the county. The New York and North Carolina, the Adams, and Designoll's.

The two former are not in operation now, but the latter is said to be doing a fine business. In Charlotte there are several large foundry and large machine shops, and a large cotton seed oil mill is in course of erection. It will be in operation this fall.

A State of which so favourable an account can be given is not likely long to remain neglected, and I hope the profits within reach will be realised by Englishmen. As to my amalgamator, your insertion of Mr. Clayton's letter in an early Journal will much oblige me, and will, I have no doubt, help the low grade ore mines here.

Thomasville, North Carolina, Oct. 7. HENRY MOON, M.E.

POTOSI GOLD MINE.

SIR,—You were good enough to insert one or two letters from me in August referring to the property above named, and complaining of the unsatisfactory nature of telegrams and reports received. Time is said to test all things, and unfortunately for those who placed their faith in the statements then made, the results are in the highest degree unsatisfactory. The accounts anxiously looked for are just published, and prove conclusively that the glitter of a few months since was certainly not of gold, or in plain words that there was no absolute foundation for the glaring nature of the afore-named dispatches. It would be invidious on my part to make here any allusions of a personal nature, there will not be wanting many probably who will do so, and in no measured terms at the forthcoming meeting.

I would remind my fellow shareholders, however, at the present stage of affars of a maxim probably not unfamiliar to many, something to this effect:—"Wise men sit not down to bewail their loss, but cheerily seek how they may redress the wrong." With this end in view I would draw attention to what many may recognise as a somewhat parallel case. I refer to the condition of the Emma Silver Mining Company some four or five years ago. Potosi affairs are bad—very bad, but in comparison even now bright and cheerful. At the time referred to Emma shares, after having been dealt in at 30*l.* or thereabouts per share, had sunk to about as many pence, and were practically unsaleable. In addition to a capital of 1,000,000*l.* sterling a large debenture debt had been incurred. The mortgages had long since foreclosed, and the mine singularly enough passed into the hands of the original vendors. At a meeting held in London, probably looked upon by many as a forlorn hope, to consider the position of affairs, a gentleman, whose name is well known in the City, made a somewhat novel and singular statement to the effect that the Emma had ceased so far as the shareholders were concerned to be a mining company, and was now a lawing company. It was not long however, thanks to the energetic efforts put forward by the gentleman referred to, before the Emma Mine was handed back to the original shareholders free of all liability, and with it a working capital of 25,000*l.*, and all this without calling upon the shareholders for a single penny.

There will not therefore, I hope, be wanting among Potosi shareholders sufficient spirit and enterprise to take advantage of so clear a precedent as the one cited. NIL DESPERANDUM.

Austin Friars, Oct. 25.

GOLD—HOW, AND BY WHO, USED AND TREATED, &c.

SIR,—There are one or two things connected with mining which are in use every day, and although in such common use would seem at first sight to be a thing of not much importance; but in reality is the life and soul of mining enterprise. A good deal has been hinted to of late in the *Mining Journal* by directors and shareholders of various companies, who cannot understand why it is that their properties do not turn out something like their prospectuses set forth, or as their inspectors have reported on them, or, as I have read of several lately, that they have been continually receiving favourable fortnightly or monthly reports, but the favourable return day never arrives. In a good many cases the excuse set up is that, through some unforseen occurrence, or some unaccountable accident, or for want of some process, that something or other could not be done, and the results could not be attained. It is in this lame way that investors are told how they have lost their capital, to the detriment of themselves and mining in general. I have been in different countries these last few years, where I had the privilege of seeing for myself no less than eight of the aforementioned cases fully illustrated; the capital of the eight companies amounting to 700,000*l.* I have the prospectuses of five of the companies, and have read the prospectuses and reports of the others. I have also from time to time seen the reports sent to the directors. But what has enabled me to speak and write on them is that I have been on the whole of these so-called mines, and I can say, without fear of contradiction, that the floating prospectuses, the primary and succeeding reports of these eight companies have been over sanguine. Six of these came under my notice within the last three years in India, and two others in Australia; and I can truthfully say that these eight companies with their capital of 700,000*l.*, and I think over three-fourths has been called up and spent, that not one of them ever had anything to justify the raising of large capitals to work them.

I do not wish to shut up speculators' pockets nor lock up capital. I am a mining engineer, and have to earn my bread as well as others, but there are now laying idle many good lodes that ought to be working. I know of one myself laying idle, simply because I cannot indite such a glowing prospectus as a good many have been accustomed to read. But with a capital of 20,000*l.* the land could be purchased, the mine developed sufficient to make it remunerative, with all necessary machinery and appliances, and in six months after the mine had been in full work the mine would declare more gold in dividends than the whole of the eight companies ever raised, or ever will raise, out of their several lodes, even with their large capital. The one I allude to is in Australia in private property. A shaft has been sunk on it to a fair depth, and has been cross-cut through in four places as far as gone; it will average about 20 ft. wide, and with good management, 20 heads of stamps, and necessary appliances, would yield a steady dividend. Another thing good one cannot help noticing is, the machinery some companies get for their properties. I know of three companies who appointed a man to select their machinery, which he did, basing his calculations on the reports that had come to hand showing the amount of stuff that could be raised and would require treating. The machinery was bought and forwarded to the mines. The purchase of it, the freight by water and transit by land, altogether costing 30,000*l.*, and nearly the whole of it is to be seen now around the mines laying idle—no use for it, and a good deal of it overgrown with grass and scrub. The gentleman appointed introduced the pulverisers, disintegrators, and other things for crushing quartz; but when they came to be put in use they found that to keep enough of these things to work they would require a good size foundry with a full staff of men, which would be fatal to any mine. Pulverisers are very useful for many purposes, but not for the first crushing of gold quartz when only Cornishmen, who do not understand them, are available. I have seen and tested a great many different sorts of machines for crushing gold quartz, but I have never seen anything to equal a good revolving stamper. Many men are well versed in appliances for treating tin, copper, or lead, and think they are also competent for gold, but I can speak from experience, and I think others in the business will admit as well, that unless a man has had a good practice with gold ores he is not qualified for the treatment of it, and oftentimes he does not know what gold he is losing. One thing also I would impress on the makers of machines is the best process of amalgamation, this being the aim of all the primary processes. This would guide them in their researches for new and improved machines. At present nearly the whole of the gold mining machinery is manufactured by American and Australian firms. The only thing made in England is the different grinding and roasting appliances for the extraction of gold from pyrites. I have seen in Australia many different sorts of machines made by English firms, but scarcely any of them do the work they should do, because the inventors do not know the principles of treatment necessary, and consequently do not send out a suitable article.

Another thing which receives a greater study in the colonies than it does in the West of England is the transit of men in mines; several letters have appeared lately on this subject. I visited the Polytechnic Exhibition at Falmouth a few weeks ago, and there saw some appliances called safety-cages, but I do not think there was one that could be depended on; many a little model will work well when acted on by a piece of cord, but if made and subjected to a thorough trial with different lengths of rope (as it might break) in different parts of the shaft that the result would be like many others I have seen, and no one found willing to risk themselves in it during a thorough test. Whilst I was managing a mine in Victoria I got up a competition for testing the merits of several different safety-cages, hooks, and supporters. It was well patronised both by makers and users. The law of that colony compelling the use of safety appliances wherever men are lowered or raised by any other process other than a windlass, which means safety for lowering or raising men, safety for falling debris in the shaft, and safety detachment and support in case of overwinding, and indicators in engine-room, showing the actual position of the cage. Several appliances were sent, and all were tested, some with very good results. Amongst the competitors were two American and one German invention; but the laurels were won by a Victorian maker, who has given it his whole study, and who now has a good factory for the different appliances. Safety for overwinding and for falling debris are now as complete as can be desired. But the genius will find a wide field for his inventive powers in safety-cages. I have seen a great many both in model and in use, but I never yet saw one that could be relied on when a rope broke with a good length attached to the cage. The mere test of slipping a hook close to the cage or shackle is not one that can be relied on for every place. The best I have seen is one fitted with flat and spiral springs acting on eccentrics and cams gripping the skids near the top and bottom of the cage each side, and so fitted as to give a counter balance between the cage and a long or short length of broken rope, and also fitted when in use for lowering or raising men, with a portable handle to be shipped into a socket to act on the eccentrics and cams, by which means the men in the cage could immediately stop it. There are in this even one or two imperfections, which if it could be surmounted would make it very complete. I think shortly to hear of its being done.—*Roche St. Austell, Oct. 23.* WILLIAM J. GRIGG.

THE KIMBERLEY DIAMOND MINE.

SIR,—Having been in Norway valuing some mineral deposits for some English firms I did not see your article on the South African Diamond Mines, which appeared in the Journal of Oct. 6, until yesterday. You justly remark that "Mr. Watson's report, coupled with the republication of my letter, which first appeared in the *Mining Journal* of Oct. 22, 1881, appears to have driven some persons at Kimberley almost frantic, and has led the Diamond Fields Advertiser to make observations which would be objectionable were they not so amusing." The article in question was written for the sole purpose of endeavouring to injure me professionally with my clients; yet, Sir, if the writer was as well known to the people of England as he is to myself and the people of Kimberley there would be no necessity for me to notice it. With all those who know me I have nothing to fear, and the transparent malevolence of the article will, I hope, defeat its object even amongst strangers. I have no hesitation in saying there is not a sentence of truth in the whole article.

The writer in question tries to point out that I was actuated by malice in writing my letter of Sept. 16, 1881, because the Mining Board refused my offer to secure the Kimberley Mine for a little over 800,000*l.* This I emphatically deny, and I claim to be a much more substantial friend of Kimberley than any parasite of the Mining Board. At the same time, I do not hesitate to say that had the Board accepted my offer the Kimberley Mine would to-day have been perfectly secure, and leaving handsome profits, instead of in its present insolvent and almost unworkable condition. From the first time that I saw the Kimberley Mine I condemned the mode of working, and was the first to point out that their mode of administering the concern could only end in disaster. In order to show that I condemned the mode of administering the Kimberley Mine long before I made the offer to secure it I quote a few extracts from my official report to the Government in August, 1879:—

1.—I have been very much struck since I have been here by the absence of any properly organised scheme for working the Kimberley Mine. The whole system appears to be simply a trusting to circumstances, a mere groping in the dark, and is, in my opinion, unworthy of such a grand industry. In fact, one of the grandest industries that has ever fallen to the lot of any country.

2.—It appears to me that notwithstanding the appliances at the command of the Board they do not make any progress in securing the permament safety of the mine, &c.

3.—I cannot help remarking that if there is another mode of removing the reef more expensive than the one adopted I am not acquainted with it.

4.—I cannot help thinking that there is a shirking of responsibility on all sides in connection with the working of the mine, for although I have been very diligent in my enquiries I have failed to elicit from any person what is to be the ultimate result of the works now in hand.

5.—As to the fixing of the machinery that requires no comment, as the greatest novice in such matters could not have made a greater mistake.

6.—I do not think (considering they are taxed to the amount of 150,000*l.* per annum) the proprietors of claims get an equivalent for their money.

7.—Taking into consideration the remoteness of the period at which the mine is likely to be cleared of reef and established on a sound basis, according to the present mode of working, I shall recommend, in the first place, the advisability of taking down the sides of the mine as far as the igneous rock at an angle of 45°. And in order to carry this into effect, I would, in the second place, urge the advisability of letting the whole concern by contract to some first-class firm or company, and allow them to originate their own plans.

8.—According to the present mode of taking away the reef it will not be sloped down all round the mine to the igneous rock at an angle of 43° in very little less than 10 years.

9.—If the expenditure for the next 10 years increases at the same ratio as during the last two years it will be such a strain on the resources of the mine that nothing but a veritable El Dorado could stand it. But if a company such as I have recommended were to be afforded every facility for working according to their own plans they would complete the work to the satisfaction of the proprietors for about 800,000*l.* This at first sight may appear a large figure to many, but it is a mere bagatelle compared to the sum total of what it is likely to cost if some such scheme as I have recommended be not adopted.

As soon as the Government published my report it was taken over by all the colonial papers, which for many weeks were inundated with letters and articles trying to disprove the correctness of my statements. The parasites were besides themselves, as they saw that if my suggestions were adopted the diseased tree from which they obtained their nourishment would be supplanted by something more healthy. The objectionable writer to which you refer endeavoured to show that it was the best conducted concern in the world, and that in three months the mine would be quite clear of reef, and at short intervals he has repeated the same story during the last four years, to find at last the mine virtually collapsed, and the Mining Board prepared to hypothecate the whole concern for the purpose of raising money to meet its liabilities. The warnings contained in my report to the Government were unheeded, and I regret—sincerely regret—to say that my worst anticipations have been more than realised. However, my crowning fault at Kimberley was the unsparing manner in which I condemned the abominable traffic in stolen diamonds, and the facilities afforded to companies of entering 50 blacks on the pay-sheet when there were only half the number employed. I should not again have written anything in reference to the Kimberley Mine if it were not for the vile article which appeared in the Kimberley Diamond Fields Advertiser of the 1st ult.

But, in justice to myself, to the *Mining Journal*, and to those investors who rely on its columns for information I am bound once more to supply your readers with the unvarnished truth. I have never in a single instance spoken disparingly of the value of the Kimberley Mine; and I repeat that, if properly conducted and the whole of the diamonds it contains would average only 15s. per carat, it is the richest mine in the world. Unfortunately, however, for South Africa generally and Kimberley in particular, the mine has been almost ruined. I say the fault is not in the mine, but in the constitution. The Mining Board is in no way adapted to the proper control of such an undertaking as the Kimberley Diamond Mine, and the Government never ought to have allowed it to pass out of their own hands. Every person in Kimberley will admit that the Mining Board has been made the arena over which individual interests have been fought, and members in order to secure a temporary personal advantage appear to have lost sight of the more important consideration—the permanent development of the mine. Then, again, the Mining Board has been unfortunate in the selection of most of its officers, some of whom appear to devote more attention to the production of scurrilous articles than to the interests of the mine. There is no doubt but what these articles amused the Board, but the mine suffered; and I have no doubt in my own mind that if the excavations were measured to-morrow fully 30 per cent. more ground has been paid for than has actually been removed, and the same laxity has characterised the whole of the Board's operations in the mine. These are unpalatable truths, but they are the primary cause of the depression in Kimberley. If the Mining Board be done away with, and the Government undertakes the administration of the whole concern, the mine is sufficiently recuperative to place it first amongst the best investments in South Africa. But should the Government be so weak as to entrust the loan of 500,000*l.* to the tender mercies of the Mining Board and its parasities it will establish a very mischievous precedent, and delay the introduction of the necessary reforms.

There is yet another reason why I have incurred the virulent hatred of the objectionable writer in the Advertiser and his friends—my refusal to connive at the promotion of companies that I believed to be of no value. It is well known in Kimberley that I refused many tempting offers to join in the promotion of schemes which would have made me rich, but which would be ruination to many. On one occasion a certain property was being offered in England, the sale of which was made contingent on a favourable report from me, and the would-be vendors tried all in their power to get it; they first offered me 10,000*l.*, and subsequently 30,000*l.* in cash and free shares, which is well known I indignantly refused, and it was then I wrote the letter to your valuable Journal which you republished on July 28.

The above is a plain statement of facts which have been called forth by the malevolent article in the Kimberley Advertiser, and I leave your readers to judge whether I have acted throughout *pro bono publico*. I can write a great deal more on the above subject, but as this letter is sufficiently long I defer it for another occasion.

Gunnersbury, Oct. 21. THOS. COLLINGWOOD KITTO.

INDIAN GOLD MINING—THE HONNALI GOLD FIELDS.

SIR,—With regard to the Honnali Gold Mining Company we have this morning received from Mr. Thomas Weekly, the company's mine manager a letter dated Hodrikonda, Sept. 15, of which the following is a copy:—"It is my pleasant duty to inform you of having cut the reef this morning in the 100 ft. cross-cut (main shaft). We are 2 ft. into the reef and no signs of being through it, so that as yet we cannot say what the actual width of the reef is. The quartz is highly mineralised, and shows gold freely. I consider it a splendid prospect, and it thoroughly establishes the permanence and value of Turnbull reef. I do not wish to create an undue excitement, but must affirm that I consider this a most important epoch in the history of this gold field. There can be now no doubt but that the reef increases in quality as depth is attained. Armstrong has just brought down about 50 lbs. of quartz broken from the reef by the last shot fired. Every piece of quartz (about 30 in all) shows gold. I write in haste, and send this to Shimoga to be posted so that it may reach you at the earlist possible moment."

The report for week ended Sept. 15 says:—Main Shaft: The cross-cut at the 100 level has been driven 6 ft., total distance 21 ft. from shaft, at which point we have to-day cut the reef, which is of a splendid character. The quartz is highly mineralised, containing a large percentage of arsenical pyrites and is rich in gold. I estimate it to yield at least 5 ozs. of gold per ton; it may yield much more than this, but I would rather be under than over in my estimate. I do not wish to create any undue excitement over this discovery, but at the same time I must affirm that the permanence and quality of this reef is now beyond doubt. We cannot say at present what width the reef is; so far we have broken into it for a distance of only 2 ft., and are not through it. I am confident when this reef is properly opened up it will go far to restore confidence in gold mining in India when economically and energetically conducted.

Madras, Sept. 18 WILSON AND CO.

TIN DISCOVERY IN SOUTH AUSTRALIA.

SIR,—Advices from Adelaide inform me that a sample of 7 tons of tin ore from Mount Wells, in the Northern Territory of South Australia, has realised in Sydney 400*l.*, being a little over 57*l.* per ton. The stream tin assayed 73 per cent., and the lode tin 50 per cent. As a beginning this result is eminently satisfactory; and when dressing machinery has been erected, and the Government railway completed, no doubt tin mining in this district will become of great importance to the colony, and a source of much profit to the proprietors.—*London, Oct. 25.* T. A. MASHY.

MINING INSTITUTE OF CORNWALL—TRIAL OF PULVERISERS.

SIR,—My attention has been directed to a letter from Messrs. Dingey and Son, Truro, which appeared in last week's *Mining Journal*, and as my name has been mentioned in it I wish to make a few remarks thereon. Mr. Dingey was a consenting party to the regulations adopted at the trial, and these regulations were strictly adhered to (one of the regulations being that the quantity of coal consumed during the trial should be taken as the test of power supplied, any other method being open to many objections). Mr. Dingey, at considerable expense and inconvenience to the committee, was allowed a preliminary trial of his machine, with the option to compete or otherwise; this was giving him an advantage over most of the other competitors, but the committee wished to meet his views. After the preliminary trial Mr. Dingey elected to work his pulveriser the following day for competition. The weather on the day of trial was unfavourable, and Mr. Dingey was not bound to proceed. He, however, decided to compete, and Mr. Rich rendered him every assistance in his power. It was, however, obviously impossible to protect a long belt from driving rain, in a strong wind, and at an hour's notice.

After all the trials had been completed the competitors with small machines wished the committee to take into account the fact that, as Dingey's machine absorbed all the power of the steam-engine, and the small pulverisers which were driven separately only a portion of the power, the friction of the engine being nearly a constant should be deducted from the total power employed on each machine, and if this had been allowed it would have materially improved the position of small machines. Mr. Dingey also made a request to the committee that they should make him some allowance for the delays which occurred through the weather on the day he competed. The committee, however, after careful consideration decided that, as an exact and therefore not satisfactory allowance in either case could be made, they must adhere to their regulations, and not consent to make allowances; moreover, the claims probably nearly balanced each other. After the awards had been made Mr. Dingey, jun., met Mr. Rich and myself, and complained of the award, offering to stake 20*l.* on a competition with the owner of either of the other machines. We promised to bring the matter before the committee, and also his claim to be placed on an equality with Capt. Nicholas. This was done at a special meeting held for that purpose on Oct. 11, when it was decided to take no part in any further trial, and the previous award to Mr. Dingey was confirmed, as per copy of letter annexed.

With reference to Messrs. Dingey's statement that I had blamed

Mr. Rich, I beg to state that I do not blame him in any way. Mr. Rich did all he possibly could to ensure a fair trial, and he certainly deserves the thanks of all the competitors for the zeal and ability with which he discharged his duties on this as on all other occasions whenever I have had the pleasure of acting with him on business connected with the Mining Institute of Cornwall.

Hayle, Oct. 23. WILLIAM HUSBAND.

Subjoined is a copy of letter addressed by the secretary of the Mining Institute of Cornwall to Mr. Dingey:—

TRIAL OF PULVERISERS.

DEAR SIR,—Your letter of Oct. 11 has been laid before the committee, at a special meeting held this evening, and they regret that any question has arisen to cause your dissatisfaction. The matter you refer to was, however, duly considered by the committee at their previous meetings, but to-night it has been carefully reconsidered; and the committee desire me to state that while an allowance may be due to you on account of the stoppages you refer to, they consider that it is counterbalanced by the quantity of rain which was falling in the stuff during the time your trial was in progress, a circumstance which you seem to have overlooked. The committee desire me to point out, in addition, that the quantity of coal consumed during the several stoppages does not represent so much actual loss as intimated by you, inasmuch as the steam was accumulating for subsequent work. Under all the circumstances, therefore, the committee do not feel justified in altering their previous awards.

Redruth, Oct. 16. WILLIAM RICH, Jun., Secretary.

CANALS v. RAILWAYS.

SIR,—Referring to your recent remarks on the congestion of railway traffic, will you allow me to add to them that there is a direct and calculable advantage to be derived from the use of separate lines of railway for different kinds of traffic, or at all events for different speeds. By restricting all trains that use the same tracks to the same speed the utmost capacity is given to a railway. Without going into details (which may be mathematically expressed) two pairs of tracks will carry more than three times as much as one pair if the speeds are thus regulated. But this is tantamount to making separate lines for mineral and other heavy traffic, so that the question arises—will it pay to do this? Let me take an example. The average cost per mile (I take the figures for 1878, as they are the latest which have been analysed in the Index to our Railway System) of the London and North Western, the Midland, and the Great Northern Railways is 46,600*l.* The aggregate mineral traffic of the three lines comes to 3296*l.* per mile. If these three lines were to combine to provide a pair of tracks, on which the whole mineral traffic which they all carry should be concentrated, we should thus have a gross revenue of 3296*l.* per mile for a capital expenditure of 46,600*l.* per mile. But the loudest advocates of mineral traffic on trunk lines do not now claim more than 10 per cent. profit. Thus the net revenue per mile would be only 329*l.*, or 0·7 per cent. on capital.

As the average net return on capital on the railways of the United Kingdom is 4·25 per cent., it is thus obvious how heavily the shareholders suffer by the mineral traffic. The argument of the directors and manager is that small profits are better than none. But the reply is that the additional capital taken up in providing for the earning of these small profits is so great as to involve real and heavy loss. The amount of gross tonnage worked in order to earn the above revenue would be upwards of 6,000,000 of tons. It will be seen by consulting page 233 of the Report of the Select Committee done on any existing line except in cases like the Metropolitan, where on Canals (c. 252, 1883) that this is considerably more than the work an enormous passenger traffic occupies the whole time. (In the table cited the gross traffic of the United States railways and of the Metropolitan line, are transposed—by a printer's error—in the second column, although right in the first.) The difference of the cost price for conveyance, allowing 4½ per cent. interest on capital, between railways and canals all over the world is shown on the second table on the same page of the report. F. R. CONDER, M. Inst. C.E.

Guildford, Oct. 22.

SAFETY CAGES.

SIR,—Your correspondent "T. G. M.," in the Journal of Oct. 6, has been kind enough to take notice of my former letter on this subject, and to give a qualified approval to the idea I started. With reference to my offer to communicate details he suggests that I should do this publicly through your columns. I must frankly answer that I am not quite prepared to do this, and am quite sure the reason will be obvious to "T. G. M." as well as to all your readers who may be interested in the matter. My offer referred to private communication, as "T. G. M." has evidently understood. "T. G. M," in conclusion, suggests that "some of our practical mining captains" should pronounce on the feasibility of my contrivance. Of course, I shall be very glad to submit it to their criticism when matters have reached a certain stage; but meanwhile let me call the attention of "T.G M." to the fact, mentioned in my last letter, that the contrivance is "founded on close observation of the behaviour of cages in shafts," and let me assure him with all modesty that I myself am a practical mining manager, that I have already been able to make very successful modifications on winding machinery in a small way, and let me ask him to pardon me if I assert that I myself am not incompetent to pronounce on the feasibility of mechanical arrangements.

Huelva, Oct. 15. R. M.

THE TREVITHICK AND MURDOCK MEMORIALS.

SIR,—I observe by last week's *Mining Journal* that the proposal for the erection of a memorial to Trevithick, proposed by Mr. Hyde Clarke a year ago, shows signs of revival, and I should be the last to discourage the promoters or say a single word calculated to weaken the claims of the eminent Cornishman to enduring recognition in the form contemplated. At the same time it would in this instance be the height of ingratitude to ignore the maxim—*Seniores priores.* Trevithick was unquestionably a great inventive genius; but after all, had William Murdock not previously applied steam as a motor to the propulsion of wheeled vehicles the chief title of Trevithick to lasting distinction as the patentee of the first practical high-pressure fixed and locomotive engines would probably have had no existence. There can be no question that it was the model locomotive constructed by Murdock at Redruth, and tried on the road to the parish church of that town exactly a century ago next year, which suggested the products of Richard Trevithick's fertile mind. Trevithick was a pupil of Murdock's, and some time before the trial of Murdock's model steam carriage on the road the pupil had opportunities of witnessing the model in motion at his master's house. Murdock was the undoubted originator of the application of steam to land locomotion. Trevithick improved upon the invention of his master, and George Stephenson succeeded in adapting the idea which had already taken shape and development successively in the brains of his two distinguished predecessors and Hedley. But it is marvellous how persistent is the neglect of the memory of Murdock even by mechanical and civil engineers—to say nothing of the enormous obligations of the world to him as the inventor of gas. We ought now to be celebrating the centenary of land locomotion by steam, which owes its birth to William Murdock, who in 1784 ran his diminutive engine on wheels round his room at Redruth in the presence of Trevithick. The mind of the latter was a *tabula rasa* on the subject until Murdock made locomotion by steam a reality.

Notwithstanding these facts, what do we find? Mr. Hyde Clarke passes over Murdock's merits, and proposes a public memorial to Trevithick, who took the idea of the former and extended its application. The Mining Institute of Cornwall—which ought to know better—have strangely ignored the teacher and predecessor and determined to concentrate their homage upon his disciple and successor. Six months ago the Committee of the Institution of Civil Engineers resolved to raise a fund for the same purpose. If it be replied that the memorial movement in question is chiefly to be regarded as a movement of Cornishmen to raise a monument to a great Cornish engineer, then I ask did not Murdock give Trevithick the very idea for which the latter is to be commemorated in Cornwall, and did he not spend in the Duchy about 20 of the best years of his life, contributing during the whole of that period more than any other man, by the erection and perfecting of Watt's engines to the efficient working of the local mines?

There are some who, despite the seeming apathy of thousands who have professionally, economically, and financially entered into the fruits of the original inventions of Murdock, will not allow his claims to sleep. He is as truly the great-grandfather of the vast railway system of the world as Trevithick was the grandfather, and Stephenson the father of it. The father was handsomely rewarded in his lifetime, and has been adequately remembered since his death. I can have no possible objection that the grand-parent's memory should also have its due. But it will be a reproach to the railway companies and the travelling public throughout the world now that the 100th anniversary of the birth of land locomotion by steam has arrived, if those who have benefited alike by steam land locomotion and gas do not at once and heartily combine in erecting a worthy memorial to William Murdock. M. MACFIE.

Highbury Quadrant, Oct. 26.

MINING PROGRESS—TECHNICAL EDUCATION, AND TENURE OF MINES.

SIR,—I often notice in your valuable Journal letters complaining of the conservatism of miners in holding to their old methods and unimproved machinery; and in your report of the lecture given on the opening for the session of the Mining Engineering Department of the Yorkshire College, the Chairman of the meeting says that undoubtedly in metal mining the average practice on the continent was superior to the English, and that the remedy was the instruction given by such institutions as the Yorkshire College. Now this conservatism and this inferiority are traceable to one and the same cause, and improved technical education alone will not remedy it, for if men are sufficiently educated in England, they at once go off to countries where they have a larger and wider field for the exercise of their abilities. Not, however, a larger and wider field alone, because the country is more extensive and the ground more productive, but because the workers of the minerals hold them permanently, and the profits are their own. They are able, therefore, to erect the best machinery, and put up everything necessary for the economical and systematic working of the mines in the best manner.

How is it in England? How many mines in England have a lease for more than 21 years? And I should like to know how a mine can be fitted up for working in the most approved system and on a large scale, with the slightest chance of the required capital, let alone the interest, being returned in the space of 21 years. But the landlord will renew the lease? Yes; at his gracious pleasure the lease will be renewed; but what if your capital and labour have made the mine highly valuable? We have lately had examples, the lord will require a heavy fine or an increased rent or royalty, or will wish to dictate conditions as to future workings, or perhaps all three of these conditions will be imposed. Under this system, if it can be called such, English mines have as a rule been worked in a small way, and have been the sport of sharedealers and promoters; but the present low prices of produce, which must for the future be looked upon as rather the rule than the exception, render it necessary for mines in order to pay good profits to be worked upon a large scale with the very best appliances, and with good trained engineers at the head of them. This is impossible under the present conditions of short leases and high royalties, for people cannot be expected to lay out their capital virtually at the mercy of the landowner, however much he may be esteemed. Landlords, of course, cannot be blamed for the conditions which exist. They take their legal rights as they find them, and I should be sorry to say a word against them personally; but it is the laws which give them those rights which should be blamed and which should be altered.

The passing of a law regulating the tenure of mines is admittedly required, and I think the time has come when it should be seriously considered with a view to a practical result, and if those interested in mining would only take the matter up with sufficient determination an association might be formed temporarily to formulate a bill and see the thing carried through. It is a matter of national importance, for the prosperity of the mining industry forms a large factor in the prosperity of the whole country. The two most important conditions which should be insisted upon by all interested in mining, without the slightest hesitation or giving way, are—1. Fixed universal royalties for each mineral (say) from 2 to 5 per cent. —2. Tenure in perpetuity, subject only to (*a*) the mines to be continually worked to the best advantage; (*b*) regular payment of royalty. The other conditions to be inserted in any bill would be of minor importance, and could easily be agreed upon.

This may seem almost revolutionary, but it would touch mineral rights only, and I cannot see why it should not be practicable if brought forward with determination and unanimity by the mining interest. It takes nothing from anyone, but only finds fair limits, and would result in an increase of royalty to the lords through the larger production and great increase in sound mining enterprise which would undoubtedly follow. In fact, it would be a national blessing.

There are plenty of men in England who are capable, and under the new conditions would have the scope, for rendering the average practice in mining in England equal to any in the world, but with the present insecurity to miners and the consequent hand-to-mouth working there is no such scope. How could a Mechernich mine come into existence except under the conditions I have named?

Carmarthen, Oct. 18. L. E.

A DISCURSIVE VIEW IN THE INTEREST OF MINING—No. I.

SIR,—The world with its accumulating weight of years—apparently from the order of routine—has been said to grow older, and that in consonance therewith succeeding generations of mankind become physically weaker, but understandingly wiser. But whether this be true or not is open to question, if not to graver doubt. The material and mechanism of mother earth may be, and unquestionably are, perpetually self renewing, whilst the advances and acquisitions of science and the arts may merely add to the stores of human knowledge and convenience, without increasing its collective or aggregate wisdom. If wisdom implies the proper application of knowledge to the achievement of beneficial, beneficent, and necessary purposes, consistent with the laws, duties, and privileges of progression, and the more advanced stages of sentient and intellectual life, it is to be regretted that in respect of one of the staple industries of civilised progress there should be evinced so little of it. The knowledge by which mining is characterised to a very large extent—for that is the industry referred to—would not survive the scrutiny of critical investigation without reproach. Great as are the advantages resulting from it in social, scientific, political, commercial, and industrial circles, its pecuniary advantages to its *bona fide* patrons fall vastly short in too many of their enterprises of what they should be. The native obscurity surrounding, and inseparable from the physical phenomena which constitute the basis of its science and of its success affords ample ground and an available platform for the gladiatorship of reckless aspirants and insatiable vampires who fabricate doctrines and falsify facts to accomplish their ultra-nefarious purposes. A license is given to the imagination, with no reference to truth or the sturdy logic of events, other than the victimising of the unsuspecting and the credulous. Bubbles are floated, with or without reference to natural realities, garbled agreeably with the art of chicanery, at the instance of circumstances and the prevalence of impatience to be rich at a bound in moneyed circles. Clap-trap is resorted to from faith in the old adage that "it is better to please well than to serve well;" that is that it tends more to the success of nefarious designs to exhilarate the fancy than to stimulate and exercise the rational faculty.

It is too frequently and too generally taken for granted that there is no valid foundation in mining for philosophical research and rational conclusions—that it is beyond the province of reason, and antagonistic to its attributes and jurisdiction, and hence the voluntary abdication of its functions, or its practical dethronement, by a studied departure from and a ruthless ignoring of its precepts or dictum, just as if this were a department or province of Nature exempted from its domain. The annulling of reason in this regard has produced the foulest and most fatal blot disfiguring the escutcheon of mining. In itself and of itself it professes an investigation of one of Nature's most intricate and abstruse arcanas, and reason—the highest active attribute of intellect—has, it is assumed, no jurisdiction in this realm. It may not be so said in words, but what amounts to as much, it is ignored. If its jurisdiction extends so far it is regarded as unequal to a comprehension of its office, or to a recognition of the primary and essential features and factors which constitute its upbuilding a mental structure on a physical basis, founded on facts ineffacable and indestructible as simple truth itself, which being indivisible can never die. But what is truth, it may be asked, in respect of mining, and who can arrive at it, or at a comparative identification of it but by expensive researches, costly practical experiments, and with all which may it not elude its grasp? We should not be unmindful that there are facts to begin with, which together constitute an objective reality, and excite a propensity of curiosity and desire. The promptings of desire being the most potent incentives to the acquisition of worldly wealth and knowledge there is a constant stimulus to human action. In the first place—in regard to the industry we are discussing—there is the vein or veins, which previous knowledge and experience teaches us to be the natural channels and repositories of metalliferous ores of one kind or another. Then there are the containing rocks, appreciably favourable or otherwise, according to the dictum of knowledge and experience of the observer, whether practical or speculative, or both. Again, there are or may be, transverse and oblique intersections of metalliferous and other veins known to be associated, or apprehended to be, with the prolific resources of mining. These, with other facts, are basal at the initial stages, and either actuate or discourage practical procedure.

It is here that the functions of reason commences, or should commence, in order to determine between the dictum of abstract science and the analogies of practical experience, which may be in conflict, to say nothing of the vagaries of arrogant pretenders whose assumptions very frequently disgust and embarrass reason from the magnitude of their absurdity, and the difficulty of contending with and silencing obstreporous fools. Nature abhors a fool as much as, it has been said, she abhors a vacuum—a similarity of repugnance, it will be perceived, and from similar incentives. If experience has demonstrated, as it has done again and again, that certain combinations of rocks, veins, and other attendant associations, specifically conditioned, have been frequently found productive of anticipated benefits, answering to expectations founded on the recognition of familiar facts and features, and other evidences rationally corresponding to those which again present themselves in another enterprise, it is the province of reason whether or not differences of minor import occur to determine conclusions, which, in most cases, will be consonant with common sense in the letter and spirit also, inasmuch as demonstrated facts and results will outweigh scientific abstractions, and consign to oblivion the audacious assumptions of the ignorant and inexperienced. ROBT. KNAPP.

Ione, Nye County, Nevada, Oct. 3.

QUICKSILVER IN EXETER.

SIR,—As several enquiries have been made referring to this discovery, I beg to add that the channel of dark-coloured rock where this metal has been seen is about 7 ft. wide, and that I have frequently taken out specimens during the last six years; but these can be obtained only when the river is low.

Exeter, Oct. 22. W. WOODFORD, Wheelwright.

PRACTICAL MINING—PREPARING ORES FOR MARKET.

SIR,—In last week's Journal I noticed an illustration of self-acting mineral dressing machinery by Messrs. T. B. Jordan, Son, and Commans; and in another page there is a notice, under the above heading, which infers that it is the design of these gentlemen; but, in fact, it is identical in principle with the self-acting mineral dressing machinery so long manufactured by Mr. George Green, and successfully working in numerous mines. I think it only right that this should be stated, and as possibly some few persons may be led to suppose it is something really new, which is not the case.

Aberystwith, Oct. 24. H. FRANCIS.

CORNISH PUMPING-ENGINES.—The number of pumping-engines reported for Sept. is 14. They have consumed 1153 tons of coal, and lifted 7·4 million tons of water 10 fms. high. The average duty of the whole is, therefore, 43,000,000 lbs. lifted 1 ft. high by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

Dolcoath—85 in.	Millions	52·6
Mellanear—67 in.		45·5
West Tolgus—Richard's 70 in.		47·4
West Wheal Seton—Harvey's 85 in.		61·2
West Wheal Seton—Rule's 70 in.		45·0

SYSTEMATIC TESTING OF MATERIALS.—For securing a high reputation as a manufacturer nothing is of greater importance than careful attention to the quality of the materials used, and much can be determined by inspection or reliance upon the producer, yet this is in no way equivalent to a systematic testing. An admirably arranged series of testing machinery has been designed by Mr. MOHR, and Mr. A. H. Kulmann is practically applying the machines in London. Their efficiency may be judged from the fact that at the recent Amsterdam Exhibition a gold medal was awarded to them. Each machine is specially adapted to the purpose for which it is to be used; but in all the construction is simple, and they are easily manipulated, although very powerful, whilst the results are rapidly and accurately ascertained. There is one machine for testing fine wire, thread ropes, leather, paper, canvas, &c., to ascertain their absolute strength. This machine will test up to 300 lbs. Another machine is intended for the same object, but is provided with a sliding weight balance, and has a power of about 2000 lbs. For testing wire this machine appears to be especially useful. The clamps are moveable, and are fitted with nipping wedges, so that any lateral pressure is avoided. Round as well as flat objects can be fixed in place by means of the wedges. The sliding weights are set in motion by means of a spindle and a small hand-wheel, so that it is very easy to move the weight backwards and forwards. Still more powerful machines carry the tests to 20,000 lbs. and 100,000 lbs. respectively. These can be so arranged that tests of tensile and compressive strength can be made with them. If tensile power is to be ascertained, the article undergoing the test can be fixed into the machine by means of wedges, bolts, or clamps. In order to fix the flat bars for testing serrated wedges are used, so that bars of various thicknesses can be fixed and tested. The clamps or couples can be turned so that irregular tension is prevented. In order to ascertain what alteration the object under test has under gone in the trial, there is a self-acting indicating apparatus which has also been invented by Mr. Mohr. This apparatus shows the gradual increase of strain, as well as that of the proportional tension of the article under test, in the form of a diagram. There is a small axle carrying two rollers of different diameters. The larger one is connected by a silk thread with the sliding weight of the balance. The smaller roller on being turned by means of a steel band moves a rod with an indicator. If the moving weight on the scale is displaced the indicator rises in proportion to the diameter of the two rollers. A cylinder on which the paper is fastened turns round a vertical spindle, and at its lower end has a groove in which a wire cord in connection with the article under test is placed, a weight retaining it in the requisite tension. In testing tensile strength the free end of this cord is conducted over a small roller, which is fastened to the upper tension couples and connected with the lower tension couples. When flat bars are used, the roller is fastened to the upper end of the flat bar itself, and is connected with the lower part of the bar by means of clamps. In order to obtain the relative measure for the diagram, a vertical and horizontal zero line is drawn on the paper; and then the running weight is displaced from 0 to 20,000 lbs., and a second horizontal line is marked down. The distance from each of the two horizontal lines serves as the basis (unity) measurements of the weights. If, further, the cord

of the paper cylinder be drawn to exactly 1¼ in., and a second vertical line be marked down, the distance between the two vertical lines forms the basis of the diagrams for the tension, bending, and elasticity. When bending tests are made, the end of the wire cords of the cylinder are fastened to the lever, and by turning this lever 1¼ in. towards the article under test, the measure for the diagram is determined. The combination of the moving weight balance with the self-acting indicating apparatus secures a high degree of precision, and the weight can be correctly ascertained with rapidity from the scale; while the diagrams enable the operator, when comparing various materials, to obtain a good knowledge of their qualities.

THE NEW PATENT, DESIGNS, AND TRADE MARKS ACT.—No. IV.

MISCELLANEOUS.

33.—Every patent may be in the form in the First Schedule to this Act, and will be granted for one invention only, but may contain more than one claim; but it shall not be competent for any person in an action or other proceeding to take any objection to a patent on the ground that it comprises more than one invention.

34.—(1) If a person possessed of an invention dies without making application for a patent for the invention, application may be made by, and a patent for the invention granted to, his legal representative. (2) Every such application must be made within six months of the decease of such person, and must contain a declaration by the legal representative that he believes such person to be the true and first inventor of the invention.

35.—A patent granted to the true and first inventor will not be invalidated by an application in fraud of him, or by provisional protection obtained thereon, or by any use or publication of the invention subsequent to that fraudulent application during the period of provisional protection.

36.—A patentee may assign his patent for any place in or part of the United Kingdom, or Isle of Man, as effectually as if the patent were originally granted to extend to the place or part only.

37.—If a patent is lost or destroyed, or its non-production is accounted for to the satisfaction of the comptroller, the comptroller may at any time cause a duplicate thereof to be sealed.

38.—The law officers may examine witnesses on oath and administer oaths for that purpose under this part of this Act, and may from time to time make, alter, and rescind rules regulating references and appeals to the law officers and the practice and procedure before them under this part of this Act; and in any proceeding before either of the law officers under this part of this Act, the law officer may order costs to be paid by either party, and any such order may be made a rule of the court.

39.—The exhibition of an invention at an industrial or international exhibition, certified as such by the Board of Trade, or the publication of any description of the invention during the period of the holding of the exhibition, or the use of the invention for the purpose of the exhibition in the place where the exhibition is held, or the use of the invention during the period of the holding of the exhibition by any person elsewhere, without the privity or consent of the inventor, shall not prejudice the right of the inventor or his legal personal representative to apply for and obtain provisional protection and a patent in respect of the invention or the validity of any patent granted on the application, provided that both the following conditions are complied with:—(*a*) The exhibitor must, before exhibiting the invention, give the comptroller the prescribed notice of his intention to do so; and (*b*) The application for a patent must be made before or within six months from the date of the opening of the exhibition.

40.—(1) The comptroller must cause to be issued periodically an illustrated journal of patented inventions, as well as reports of patent cases decided by courts of law, and any other information that the comptroller may deem generally useful or important. (2) Provision must be made by the comptroller for keeping on sale copies of such journal, and also of all complete specifications of patents for the time being in force, with their accompanying drawings, if any. (3) The comptroller is to continue, in such form as he may deem expedient, the indexes and abridgments of specifications hitherto published, and must from time to time prepare and publish such other indexes, abridgments of specifications, catalogues, and other works relating to inventions, as he may see fit.

41.—The control and management of the existing Patent Museum and its contents are, from and after the commencement of this Act, transferred to and vested in the Department of Science and Art subject to such directions as Her Majesty in Council may see fit to give.

42.—The Department of Science and Art may at any time require a patentee to furnish them with a model of his invention on payment to the patentee of the cost of the manufacture of the model; the amount to be settled in case of dispute by the Board of Trade.

43.—(1) A patent shall not prevent the use of an invention for the purposes of the navigation of a foreign vessel within the jurisdiction of any of Her Majesty's Courts in the United Kingdom, or Isle of Man, or the use of an invention in a foreign vessel within that jurisdiction, provided it is not used therein for or in connection with the manufacture or preparation of anything intended to be sold in or exported from the United Kingdom or Isle of Man. (2) But this section shall not extend to vessels of any foreign state of which the laws authorise subjects of such foreign state, having patents or like privileges for the exclusive use or exercise of inventions within its territories, to prevent or interfere with the use of such inventions in British vessels while in the ports of such foreign state, or in the waters within the jurisdiction of its courts, where such inventions are not so used for the manufacture or preparation of anything intended to be sold in or exported from the territories of such foreign state.

44.—(1) The inventor of any improvement in instruments or munitions of war, his executors, administrators, or assigns (who are in this section comprised in the expression the inventor) may (either for or without valuable consideration) assign to Her Majesty's Principal Secretary of State for the War Department (hereinafter referred to as the Secretary of State), on behalf of Her Majesty, all the benefit of the invention and of any patent obtained or to be obtained for the same; and the Secretary of State may be a party to the assignment. (2) The assignment shall effectually vest the benefit of the invention and patent in the Secretary of State for the time being on behalf of Her Majesty, and all covenants and agreements therein contained for keeping the invention secret and otherwise shall be valid and effectual (notwithstanding any want of valuable consideration), and may be enforced accordingly by the Secretary of State for the time being. (3) Where any such assignment has been made to the Secretary of State, he may at any time before the application for a patent for the invention, or before publication of the specification or specifications certify to the comptroller his opinion that, in the interest of the public service, the particulars of the invention and of the manner in which it is to be performed should be kept secret. (4) If the Secretary of State so certifies, the application and specification or specifications with the drawings (if any), and any amendment of the specification or specifications, and any copies of such documents and drawings shall, instead of being left in the ordinary manner at the Patent Office, be delivered to the comptroller in a packet sealed by authority of the Secretary of State. (5) Such packet shall until the expiration of the term or extended term during which a patent for the invention may be in force, be kept sealed by the comptroller, and shall not be opened save under the authority of an order of the Secretary of State, or of the law officers. (6) Such sealed packet shall be delivered at any time during the continuance of the patent to any person authorised by writing under the hand of the Secretary of State to receive the same, and shall if returned to the comptroller be again kept sealed by him. (7) On the expiration of the term or extended term of the patent, such sealed packet shall be delivered to any person authorised by writing under the hand of the Secretary of State to receive it. (8) Where the Secretary of State certifies as aforesaid, after an application for a patent has been left at the Patent Office, but before the publication of the specification or specifications, the application, specification, or specifications, with the drawings (if any) shall be forthwith placed in a packet sealed by authority of the comptroller, and such packet shall be subject to the foregoing provisions respecting a packet sealed by authority of the Secretary of State. (9) No proceeding by petition or otherwise shall lie for revocation of a patent granted for an invention in relation to which the Secretary of State has certified as aforesaid. (10) No copy of any specification or other document or drawing, by this section required to be placed in a sealed packet, shall in any manner whatever be published or open to the inspection of the public, but save as in this section otherwise directed the provisions of this part of this Act shall apply in respect of any such invention and patent as aforesaid. (11) The Secretary of State may, at any time by writing under his hand, waive the benefit of this section with respect to any particular invention, and the specifications, documents, and drawings shall be thenceforth kept and dealt with in the ordinary way. (12) The communication of any invention for any improvement in instruments or munitions of war to the Secretary of State, or to any person or persons authorised by him to investigate the same or the merits thereof, shall not, nor shall anything done for the purposes of the investigation, be deemed use or publication of such invention so as to prejudice the grant or validity of any patent for the same.

With the object of affording information to the public, until the new rules under the Patents Act are completed, the following information is issued by direction of the Board of Trade:—

1.—Applications and all other documents will be required upon strong wide-ruled foolscap paper (written or printed on one side only), having a margin of 2 in. on the left-hand part thereof. The use of parchment will be discontinued. Copies of specifications will no longer be required.

2.—The sizes of the drawing will remain unchanged, but they will be required upon drawing paper instead of on parchment. A copy of the drawings will be required upon thin Bristol board.

3.—Forms of application (stamped) will be placed on sale at the chief post offices in the United Kingdom.

4.—The forms required for an application will be (*a*) for provisional protection; application form and form of provisional specification; (*b*) for complete protection; application form and form of complete specification. Where a complete specification is not left in the first instance it may be left at any time within nine months after application for provisional protection.

5.—The fees will be 1*l.* for each stamped form of application and 3*l.* for each stamped form of complete specification. No fee will be charged for the form for provisional specification.

6.—Applications may be left at the Patent Office or sent by post. If sent by post they must be addressed to the Comptroller, Patent Office.

7.—The "Declaration" in the application form must be made by the inventor or inventors. All other documents may be prepared and signed by agents.

"Applications" for letters patent made during the present year must be proceeded with in accordance with the existing laws and rules.

HOLLOWAY'S PILLS—NO MYSTERY.—Whenever the blood is impure or the general health is impaired the human body is predisposed to attacks of any prevailing epidemic. The first indications of faulty action, the first sensations of deranged or diminished power, should be rectified by these purifying pills, which will cleanse all corrupt and reduce all erring functions to order. These pills counteract the subtle poisons in decaying animal or vegetable matter, and remove all tendency to bowel complaints, billousness, and the host of annoying symptoms arising from foul stomachs. The fruit season is especially prone to produce irritation of the bowels and disorders of the digestive organs; both of which dangerous conditions can be completely removed by Holloway's corrective medicines.

IMPROVED ROPE ATTACHMENTS.

In connection with mining operations the importance of being able to join hemp or metallic rope expeditiously and securely can scarcely be over-estimated, and there can be little doubt that thoroughly reliable rope attachments would tend materially to diminish the number of accidents; so that there would appear to be ample room for the introduction of the new invention—Kortum's patent—now being brought to the notice of miners in England and her colonies by Mr. Geo. Telschow, of King William-street. The systems of fastening at present in use—splicing, rivetting, screwing, knotting, connecting by coupling plates, and so on—are all pronounced by practical men to have great disadvantages, it being objected that they are expensive, and require much time. The successful use depends on the skill of the workman; the structure of the rope is altered, therefore the rope is damaged. The loops of the ropes have to be provided with eyelets in order to prevent its rapidly wearing out, and one of the greatest disadvantages is that after the load or tension is put on the rope the centre of the strain does not occur in the centre of the rope, thus causing injurious strains to arise where the rope is spliced or fastened. In order to overcome these defects various remedies have been tried (at least for wire ropes)—one has used conical thimbles, and after the end of the rope has been inserted the diameter of this end has been conically increased by bending the wires, by driving spikes into the core of the rope, or by casting hot metal round it; in other cases the ropes have been pressed together by bolts and nuts, eccentrics, levers, &c. All these arrangements allow a more or less axial strain to take place upon the rope; but they all have the defect of weakening the rope chiefly, and in the greatest degree, at the entrance to the thimble; and, therefore, some of the wires at this place are quickly destroyed, nipped off, or worn through successively. Also in the old modes of splicing, &c., the success depends on the skill of the workman, and even when most skilfully performed the rope suffers a great deal, because through untwisting and otherwise dealing with the rope the positions of the wires and strands to each other are altered, and, therefore, the attachment of the same becomes unequal. Casting hot metal round the rope has the defect of altering the nature of the material.

It is to avoid and remove these defects that Kortum's patent rope attachment has been designed; it consists principally of a conical shell or thimble provided with a hook, loop, &c., and of toothed wedges, which take up and compress the rope between them, and which automatically fasten the same, the compression of the rope corresponding to the tension. The wedges surround the rope, and exert upon it a pressure concentrically, which increases the adhesion and friction, and prevents all dislocation of the threads or wires, so that the whole of the wires equally participate in holding the load. The wedges are provided with teeth on the inside, which indent the body of the rope. No damage or injury to the threads or wires can arise, because in consequence of the resistances elongation cannot take place, and the natural breaking of a rope can only arise after the limit of elasticity has been reached. As, however, the useful resistances—that is to say, the friction, &c., between wedges and rope—have to be greater than the dynamic resistances (resulting from the friction between the back of the wedges and the inner surface of the thimble), if a gliding forward of the wedges takes place and the attachment of the rope be firm, such a construction of the teeth is required as permits the use of such conical wedges of such a taper as not to exert an excessive pressure on the rope, and also thimbles of very small substance. And, lastly, the wedges have a greater amount of conicity than the thimble, and the length and thickness of the teeth decrease as they are farther from the actual joint, so that the bite upon the rope gradually increases from almost *nil* until, steadily increasing, it reaches its maximum near the end of the rope.

The method of fixing is extremely simple. The end of the rope is

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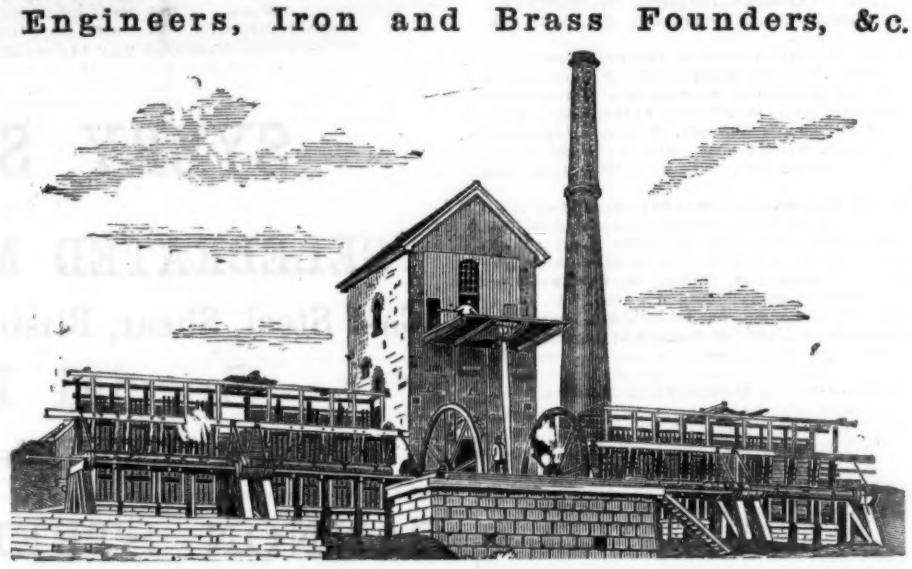

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pushed into the thimble from the lower part; then on each side of the thimble a wedge is inserted from the top end, and driven in by a few blows with a hammer; the further tightening then ensues in a self-acting manner as soon as the load is put on the rope. In order to keep the wedges in their proper place a cotter pin is pushed through a hole at the side of the thimble. When wishing to loosen or detach the rope a few blows on the loop of the thimble will suffice to make the wedges come up. It is claimed that these improved rope attachments are equally well adapted for metallic or hemp ropes as well as for flat and round mining ropes, and for tension bars in roof constructions they have proved very efficient.

Registration of New Companies.

The following joint-stock companies have been duly registered:—

Old Colwyn Land and Building Company (Limited).—Capital 20,000*l.*, in shares of 100*l.* To carry on in the county of Denbigh the business of a land and building company. The subscribers are—J. E. Reiss, Holmes Chapel, 40; M. Curtis, Heaton Mersey, 40; J. V. C. Rivaz, Knutsford, 30; R. Curtis, Limehurst, 10; H. Waterstone, Alderley Edge, 15; S. H. Bickham, junior, Alderley Edge, 20; T. C. Horsfall, Alderley Edge, 20.

Nevada Land and Cattle Company (Limited).—Capital 300,000*l.*, in shares of 5*l.* To acquire a property in said territory and to carry on a business in connection therewith. The subscribers (who take one share each) are—C. L. Young, 5, Ashburne-place; R. Hammond, 110, Cannon-street; F. H. Kingert, Peterborough; F. Ince, St. Benet's Chambers; W. Collins, Woodside; R. A. Punchaud, Leytonstone; W. M. Pinnis, Hornsey; R. Graves, San Francisco.

The Tramways Company of Trinidad (Limited).—Capital 40,000*l.*, in shares of 1*l.* To construct, lay down, equip, maintain, and work tramways in said island. The subscribers (who take one share each) are—J. Meston, 20, Spring Gardens; A. Meston, 20, Spring Gardens; A. G. S. Clayton, Upper Holloway; J. A. Bayley, 120, Cannon-street; J. Brinsmead, 18, Wigmore-street; W. C. Dalrymple, 4, Cullum-street; J. H. Payne, Manchester.

The London Petroleum Company (Limited).—Capital 20,000*l.*, n shares of 20*l.* and 1*l.* To carry on the business of manufacturers, refiners, sellers and dealers in, and storers of petroleum and other mineral oils and earthwax. The subscribers (who take one share each) are—E. M. Gregory, 61, Moorgate-street; J. Dalton, East Dulwich; F. W. Biddle, 18, Gresham-street; W. G. King, Kentish Town; G. Escourt, 22, East-street; J. Ross, 37, Great Coram-street; H. R. Armstrong, Monkstown.

The Longwitton Ganister Coal and Lime Company (Limited).—Capital 15,000*l.*, in shares of 10*l.* To acquire certain mines, seams, and beds of coal, clay-band, ironstone, fire-clay, and ganister stone under lands situated in the parish of Hartburn, Northumberland, containing an area of some 486 acres, and certain quarries and veins of limestone, containing 100 acres or thereabouts, situated at Greenleighton, in the same parish; and also quarries within the townships of Rothley, for the purpose of carrying on the various operations of a mining and quarrying company. The subscribers (who take one share each) are—J. Dix, Newcastle-on-Tyne, agent; W. Wood, Durham, M.E.; C. Humble, Newcastle-on-Tyne, merchant; J. Callender, Hartlepool, shipowner; H. J. Robson, Lesbury, farmer; T. Young, Durham, proctor; W. Scott, Newcastle-on-Tyne, contractor.

The Carandotta Pastoral Company (Limited).—Capital 250,000*l.*, in shares of 100*l.* The general business of a sheep-raising and farming company in connection with Queensland, South Australia, or elsewhere. The subscribers are—Sir C. E. F. Stirling, Grenock, 103; A. Orr-Ewing, Ballikinairn, 300; J. Houldsworth, Coltness, 100; J. D. Baird, Glasgow, 100; C. M. King, Glasgow, 100; J. M. Houldsworth, Glasgow, 100; R. T. Firebrace, Conservative Club, 100; C. Rome, Compton Pauncefote, 200.

The Oak Insurance Company (Limited).—Capital 25,000*l.*, in shares of 5*l.* To grant all kinds of assurances except life. The subscribers (who take one share each) are—T. Walker, Manchester; J. H. Fielden, Bowden; R. W. Hopkins, Longsight; W. Muir, Cheetham; A. S. Leech, Longsight; A. N. Blanchard, Manchester; W. Byers, Barton.

Sturge's (British) Motive Power Syndicate (Limited).—Capital 10,000*l.*, in shares of 1*l.* To manufacture, sell, and deal in machinery, carriages, and appliances in connection with a certain patent. The subscribers are—T. V. Gurney, Barnet, 350; E. H. Cleaver, Red Lion-square, 400; E. Moreton, 29, Queen Ann's Gate, 200; R. Besley, 21, Upper Woburn-place, 300; W. Lichfield, Lee, 400; J. M. Carter, 6, Whitehall-yard, 200; W. Whitfield, 43, New Broad-street, 200.

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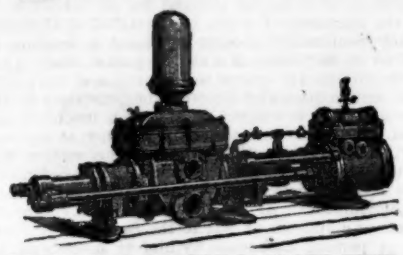
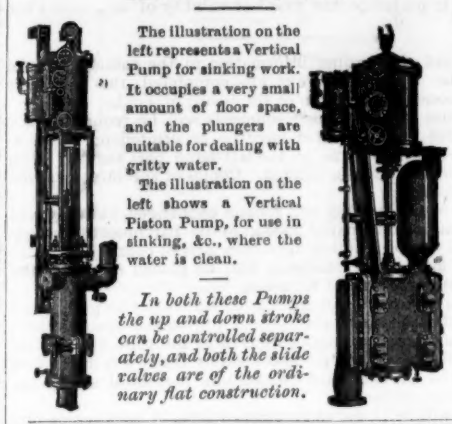


HORIZONTAL DOUBLE PLUNGER PUMP, Suitable for Gritty Water.



The illustration on the left represents a Vertical Pump for sinking work. It occupies a very small amount of floor space, and the plungers are suitable for dealing with gritty water.

The illustration on the left shows a Vertical Piston Pump, for use in sinking, &c., where the water is clean.

In both these Pumps the up and down stroke can be controlled separately, and both the slide valves are of the ordinary flat construction.

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NINE ELMS IRONWORKS,

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PUMPS FOR ALL DUTIES.

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PATENT STEAM PUMP,

WILL PUMP ALMOST ANYTHING.
NEEDS NO SKILLED ATTENTION.
WILL WORK SUSPENDED ON A CHAIN.
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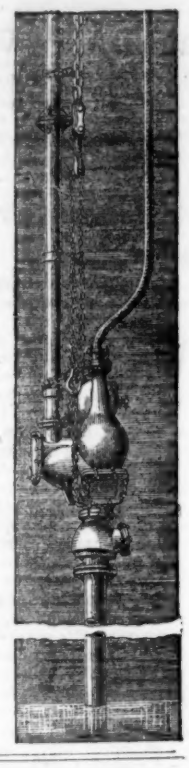
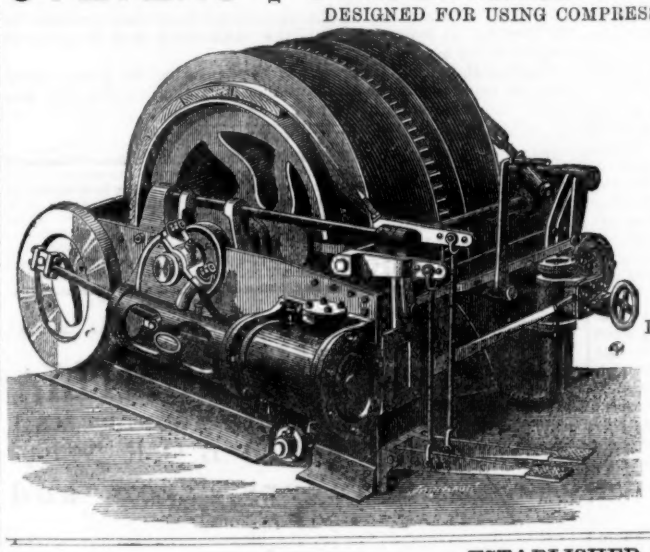
THE DEANE DIRECT ACTING PUMP, for High Lifts and Heavy Pressures. Very simple and reliable. First-class material and workmanship. Made in a great variety of patterns and sizes to suit various requirements.



The illustration on the right represents a Pulsometer suspended in a shaft.

STEVENS' PATENT UNDERGROUND WINDING ENGINE,

DESIGNED FOR USING COMPRESSED AIR OR STEAM.



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No. 1 size, 7 in. single cylinder, with 2 ft. drums.
No. 2 size, 9 in. single cylinder, 2 ft. 6 in. drums.
A,— 6 in. double cylinder, with 2 ft. 3 in. drums
B,—8 in. „ „ 3 ft. 0 in. drums.
C,—10 in. „ „ 3 ft. 6 in. drums.
D,—12 in. „ „ 4 ft. 6 in. drums.
E,—14 in. „ „ 5 ft. 0 in. drums.

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CANNON STEEL WORKS, SHEFFIELD.

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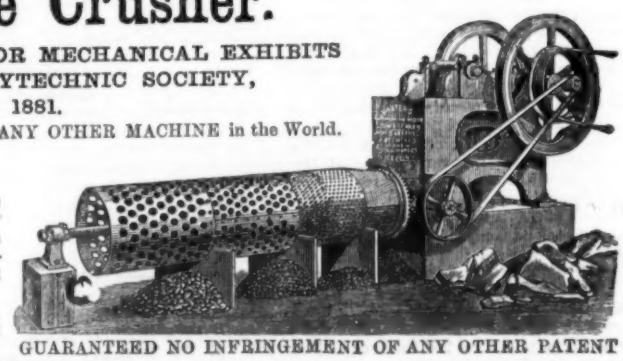
Dear Sir,—I am pleased to be able to tell you that the Machine works splendidly. We are breaking 16 trucks a day now and we thought it a good day's work to do 10 a day with the old Machine, so you can see the difference. I had a gentleman looking at it yesterday, and he was surprised to see it work so easily. Yours truly, E. ORGAN.

The above refers to one of our 16 by 9 Machines we supplied to replace an "Improved Blake" 15 by 9 Machine.



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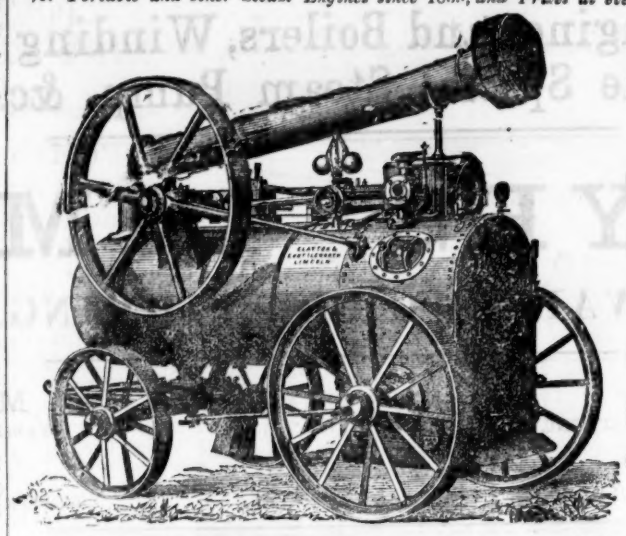

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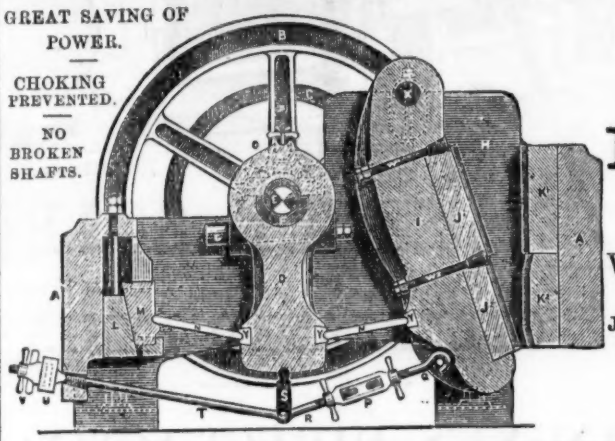

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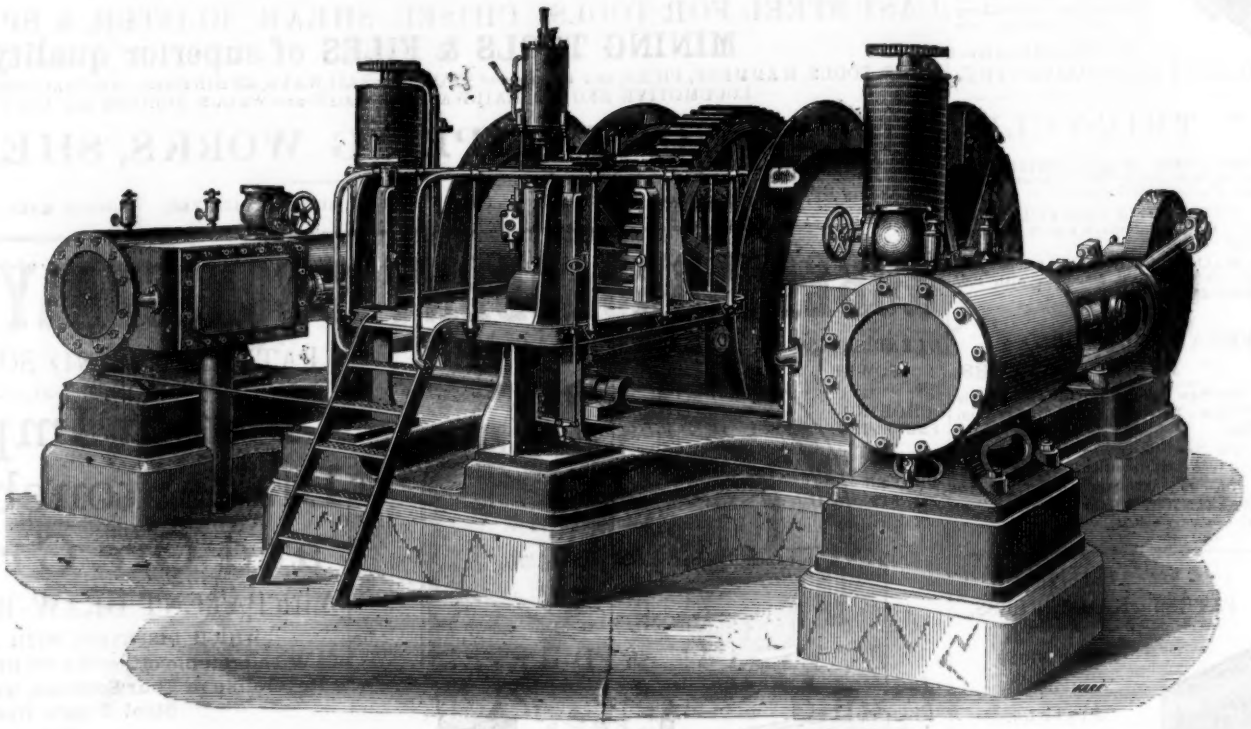

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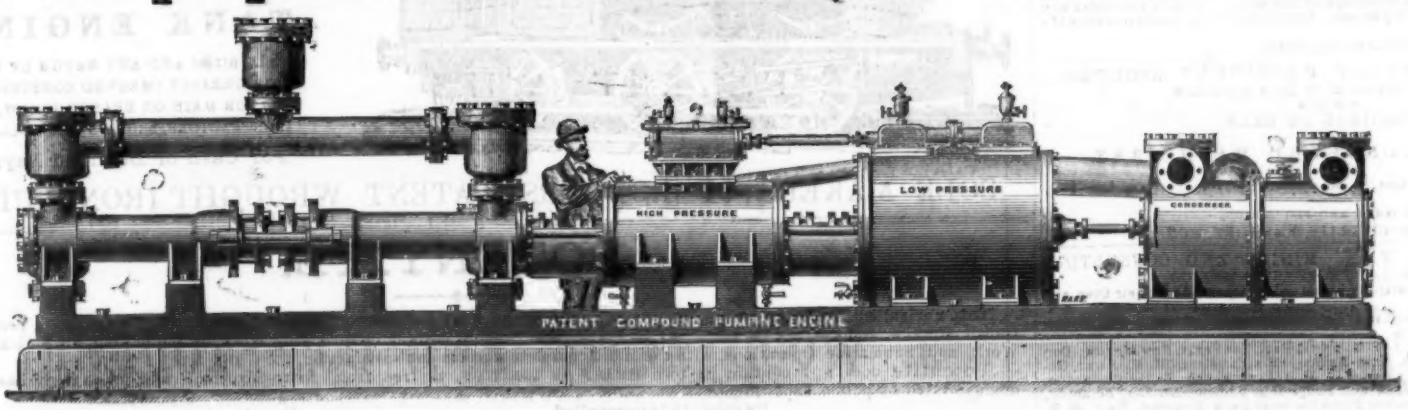

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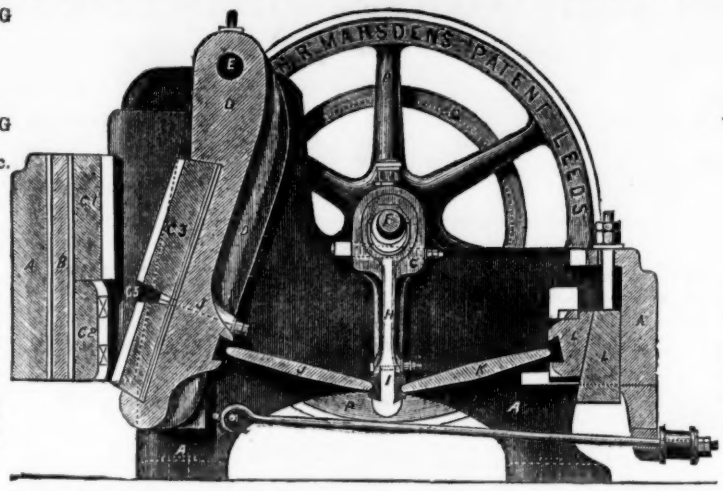

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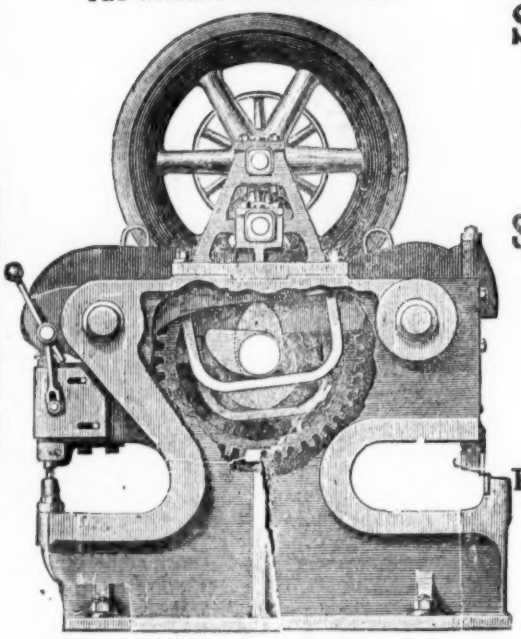

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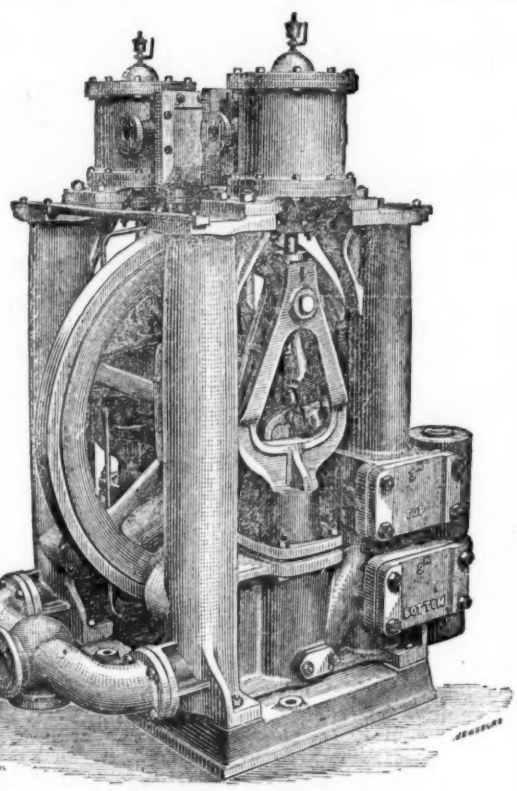

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